Bulletin of Rhode Island State College

VOL. XXXI, NO. 1 FOR FEBRUARY, 1935

REPORT OF THE BOARD OF MANAGERS

KINGSTON, R. I.

1935

PUBLISHED QUARTERLY BY THE COLLEGE
FEBRUARY, MARCH, MAY, AUGUST

ENTERED AT KINGSTON, RHODE ISLAND, AS SECOND CLASS MATTER

RHODE ISLAND STATE COLLEGE

RHODE ISLAND STATE COLLEGE
CORPORATION

	Term Expires Jan. 31
WALTER E. RANGER, Pres., Com. of Education, ex-officio, Providence	
HARRY R. LEWIS, Com. of Agriculture, ex-officio, East Greenwich	
(Appointed by the Governor with the advice and consent of Senate for term of five years.)	
ZENAS W. BLISS, Vice-President, Providence Co., Providence	1938
ROBERT S. BURLINGAME, Clerk and Treasurer, Newport Co., Newport	1936
CHARLES ESTES, Bristol Co., Warren	1939
THOMAS G. MATHEWSON, Kent Co., East Greenwich	1935
MRS. L. MOWRY SCHLESINGER, Washington Co., Charlestown	1937
(Appointed by Governor from Alumni Association for term of four years.)	
WILLIAM C. CLARKE, 1898, Westerly	1935
LUCIUS A. WHIPPLE, 1907, Pawtucket	1937

REPORT

To His Excellency Theodore Francis Green, Governor, and the Honorable General Assembly of the State of Rhode Island and Providence Plantations, at its January Session, 1935.

I have the honor to submit herewith the Forty-seventh Annual Report of the Board of Managers of Rhode Island State College, as required by law.

WALTER E. RANGER,
President, Board of Managers.

REPORT OF THE PRESIDENT OF THE COLLEGE

To the Honorable Board of Managers of the Rhode Island State College:

As President of Rhode Island State College I have the honor to submit the annual report.

Nineteen hundred and thirty-four will be referred to in the history of Rhode Island State College as the year of great expectations. Near the closing days of 1933 the State Emergency Public Works Administration approved projects for enlarging and improving the physical plant of the college. It soon became apparent, due to constitutional limitations, that a vote of the people would be necessary before any construction could be undertaken. May 10 was the red letter day, designated by the Governor as the time when the people of the state should record their wishes on all P.W.A. projects. It was generally assumed that within a few months after this special election the major building operations would be under way. Only those, however, who have been closely identified with the details of working out this program can appreciate the enormous amount of work entailed on the part of architects, engineers, and administrators to get ready for building. The closing days of this year mark the approval of the final plans for all building projects. It is now only a question of a few months before operations will be under way. Two projects are already in the course of construction: the remodelling of Edwards Hall to enlarge the auditorium and provide permanent quarters for the Music Department; and the construction of the water line from 30-Acre Pond to the pumping station on the plains.

Campus improvements have gone forward steadily. The teaching personnel has been improved by the addition of fifteen new members. The public demands for services from our faculty have increased a hundred fold. The Purchasing Agent's activities have been enlarged so that they include all phases of purchasing for the college except that which is strictly under student tax. The academic and extra-curricular activities of the student body have been on a uniformly higher level. The demands for admission to the college were heavier than any time in the history of the institution. This increased demand for admission to the college creates problems that we cannot face lightly. It is easy for those not on the firing line of potential matriculants to tell you not to accept any more sudents, that the state is already sending too many people to college, that only the chosen should have a higher education, and so on. But when you have to face across the table during August and September each year fathers and mothers supported by the strongest influences in the state, it is a different matter. At that, Rhode Island is not doing as much for higher education as its sister states.

The Bureau of Education of the United States Department of the Interior in Pamphlet No. 48, issued this year, states that there are 2981 young people whose homes are in Rhode Island, who are now attending college. This is one student for each 231 of the population or one for each 16.3 of the population between the ages of 18 and 21. Compare this with 121 for Massachusetts, 153 for Connecticut, or 68 for Kansas. The average for the entire United States is one student for each 123 of the population or one for 9.1 of student age. Only four states in the Union have a smaller number in proportion to the population than Rhode Island. These are New Mexico, Florida, Delaware, and Arkansas. Three of these have a large colored population. On the basis of white population only, Rhode Island has the smallest number of students in college in proportion to the total population of the state than any in the Union with the exception of New Mexico.

Furthermore, of the 2981 college students from Rhode Island who are attending institutions for higher education, only 1515 (more than half of this number are at Rhode Island State College) are attending Rhode Island colleges. This is a percentage of 54.89. The other 1239 are attending colleges in other states or in foreign countries. To offset this, however, in part, there are 1245 students from other states attending Rhode Island colleges.

It may be true, as some people say, that colleges were never intended for the masses. But it doesn't follow, as seems to be inferred at times, that the masses should be denied the opportunities of a college education. Suppose the masses should not subscribe to this philosophy. What then? It is doubtful whether automobiles were ever intended for the masses. Henry Ford thought they were. It is doubtful whether silks and satins were ever intended for the masses. But Japanese silk producers and American manufacturers think so. There are really very few worthwhile things in life, except religion, which, in their origin in an age of scarcity, were intended by the elect for the masses. This problem of who shall have a higher education is something that those of us in college administration should consider from the viewpoint of the fellow at the bottom looking up and not from our vantage point smug in its outlook. I predict that regardless of all this nice talk about college men roaming the streets looking for jobs, the work of the future that demands more than muscle qualifications will still command special training, and the boy with a college training along rather specific lines will have the same differential in his favor as he has always had.

I can ussure you that it is not the colleges themselves that have brought on this problem of large-numbers-of-young-people-ready-for-college. With 53% more students in our high schools at present than were in attendance in 1929, there is a situation confronting every college that has not been faced squarely as yet. Most of us have been thinking only of 1933, '34, and '35. What will it be like in 1937, '38, and '39? That is the question we need to dedicate ourselves to—not the past nor the distant future, but the demands immediately ahead that we can already anticipate. Rhode Island State College would not be true to its trust nor to the ideals and purposes of the founders of the Land-Grant College System were it to adopt a different philosophy of higher education at this time. Now, more than ever, it seems to me, state colleges must stick to the principles enunciated in the fundamental act creating them. The basic idea in this enactment of the Congress in 1862 and approved by President Lincoln was to provide opportunities for a liberal and larger education to many members—not merely to those destined to sedentary professions (as Senator Morrill phrased it) but to those needing higher instruction for the world's business, for the industrial pursuit and professions of life. I predict, if the colleges now operating do not meet the rising demand for higher education, proprietary schools—much as once prevailed in the medical profession—will spring into being like mushrooms in a night. They will offer courses and use all the arts of publicity to hoodwink the unsophisticated non-collegiate public in to believing that a college training may be had at their institutions at minimum time and expense and, they should add, labor. We are confronted with a condition that demands the serious consideration of every college board. Particularly is this true as it affects the program of state colleges. These colleges came into existence when the welfare of the nation called for a new deal in higher education. They pioneered in a new field. Inspired, as someone has said, by the realization that the difficulties of democracy are the opportunities of education, they pressed on to new frontiers. They gradually built up a body of scientific information, for use on the farm, in the factory, and in the counting house. They were started when Darwin, Wallace, Huxley, and Spencer were at the height of their careers. It was the beginning of a great scientific forward movement in history. But we did not know that until we got far enough away so that we could look back.

Right now we face a situation that demands the same sort of careful pioneering that was demanded in those days. At the time of the Civil War and after it, the government created a new type of education in order to work out of its difficulties. Unless the colleges of the present era pioneer more sincerely in fields of social activity and social research — that field which has for its major objective the relationship of man and man—there will again spring up a new type of institution that will make the present system of higher education appear as much out of harmony with the needs of the times as the scheme of education promoted by the land-grant colleges made the old professional academic education of the pre-Civil War days appear. A state college, above all institutions, must be sensitive to the needs and requirements of the people of the state. No executive of a state college would subscribe to the doctrine that its objectives are to train hewers of wood and tillers of soil.

I maintain that the purpose of the type of training given at the state college is to improve the economic conditions of our people as a whole, to increase the intelligence and power of the worker for his own happiness,—and that the acquirement of skills, technique, and the like, are mere by-products and not the ends, as some maintain. The important factor in all education—state or otherwise—is the individual himself. I trust that we may always magnify the importance of the individual in our efforts at Rhode Island State College.

The Trees of the Campus

All the Lions Clubs of the state met at the college on May 11. As a part of their frolic they planted a tulip tree for each club, one for the state and one for International—making a row of thirteen trees along the road that marks the southern boundary of the campus. In anticipation of this event, the college made a complete survey of the trees of the campus. The work was directly under the supervision of Professor S. C. Damon, who writes as follows concerning *The Shade Trees on the Campus.*

"Any one interested in trees will notice with pleasure, as he approaches the College through the Memorial Gates, the rows of Linden trees that border College Road.

"Then, as one turns the corner by Edwards Hall, the picture of the Campus unfolds. The double row of trees surrounding the Quadrangle impresses one with their size and the important part they play in the beauty of the college grounds.

"This is all the more appreciated when one stops to consider that the institution is comparatively young, that the land on which it is built was purchased no longer ago than 1888, and that every tree now growing about the main campus is a planted tree. In view of these facts, it is remarkable that the trees have attained the size and development that they show today.

"One's curiosity is immediately aroused as to when and by whom the trees were planted. It is fortunate that while the records are incomplete, there are men still active in the service of the College who have been here continuously from its beginning, and from them the writer learned that the development of the Campus occurred in somewhat the following order.

"The roads around the Quadrangle were laid out in 1898, and the double row of elms that border them were planted by G. E. Adams (now Dean of Agriculture at the college) in 1899.

"Hendrick Avenue was laid out and built in 1889 following a cart path from the main road into the grounds as far as the Watson House.

"The shade trees on and around the Watson House lawn, with the exception of two large ash trees standing in front of the house, were planted in 1892. There are eighteen trees in number made up of seven different kinds.

"The first Class in College, that of 1894, inaugurated the practice of tree planting. Their number being twenty-six, they planted a tree for each member in a grove just north of Taft Laboratory on Arbor Day, 1891.

"The large evergreens on the road to the Gymnasium were set by the students to commemorate Columbus Day, 1892.

"In 1893, at the suggestion of Mr. T. G. Hazard, the Sycamore Maples were selected for planting along Hendrick Avenue; and they were set out that year by Mr. L. F. Kinney with the students on Arbor Day.

"The trees on the lawns between Taft, Davis, and South Hall were planted at different times beginning around Davis in 1891-5. There are twenty-four trees in all, comprising twelve different kinds. The elms of that planting are now the largest trees on the grounds—some of the elms being over twenty-four inches in diameter and sixty feet in height.

"The black walnut grove at the foot of the hill by the spring house was planted by the students on Arbor Day, 1894. There are about 32 trees in the grove, measuring 6-12 inches in diameter and thirty feet tall on the average. They are old enough so that in bearing years they produce a lot of good nuts.

"The Ash trees bordering the road to the Athletic Field were planted by the students on Arbor Day, 1905. There are 62 in number, measuring from 8-18 inches in diameter and 40 feet in height.

"Now follows a long period of no planting until the improvement of College Road began. The Linden trees that border the College Road were planted by the College in 1909. They are making satisfactory growth and today they average about 14 inches in diameter and 30-35 feet tall. There are seventeen on each side of the road.

"A grove of about twenty trees, comprising four different kinds, was planted to the north and west of Lippitt Hall. The Spruce have made the fastest growth, being 14 inches in diameter, while the Larch have made the slowest growth, being 4-5 inches in diameter. All were transplanted in 1909.

"Some of the earlier Classes, following a College custom, planted a tree as a part of their Class Day exercises; but today only one can be accounted for—an American Elm, planted by the class of 1897. It is a splendid tree that measures 25.8 inches in diameter and 67 feet tall. It stands just east of the Lodge.

"It is worthy of note that the Linden tree, No. 281 (opposite Home Management House), was planted in 1919 by Omicron Alpha Alpha (now Chi Omega) in memory of the heroes of the World War.

"The Alumni Association, as part of their plan to fittingly honor the memory of those students and former students of the college who lost their lives in the World War, planted a grove of Red Oak trees on both sides of College Road, May, 1922, at the very Southern entrance to the grounds. There being twenty-three names on the large boulder that stands in the west part of the grove, a tree was planted for each man. There are fourteen Oaks on the west and nine on the east side of College Road.

"On the north bank of the ravine toward the eastern boundary is a large Linden tree, noticeable because of its unusual branching. I am told that it was growing there in 1889.

"In the angle at the intersection of Lippitt Avenue and Orchard Road, Mr. A. E. Stene transplanted from the College nursery a Tulip tree in 1904. Today it is a handsome tree, 21 inches in diameter and 35-40 feet tall.

"On the west side of the walk from the State Road going south between Edwards and Ranger, tree No. 7, an American Elm, was planted by the Lions Club of Newport, as a George Washington Memorial Tree, May, 1932.

"At the north end of the Campus is a ravine with a small stream of water running through it. On both sides of the stream are natural groves of Swamp White Oak trees of all sizes up to two feet in diameter, extending from the bridge on West Campus Avenue east to the eastern boundary of the College land. The area is divided by roads into three groves, the lower one almost directly north of Lippitt Hall, covering about one-half acre and containing fifty trees.

"The middle section contains about the same number of trees that are scattered over a larger area. In this section are some of the oldest and finest Oaks.

The third and last section contains more trees in a more dense grove bordering the eastern boundary of the College land about east of Bliss Hall."

Summary of Trees on Campus

College Road—Lindens	35
Around the Quadrangle—Elms	85
Along the walk between Edwards and Ranger—Elms	28
Hendrick Avenue—Maples	110
Lawns—Taft, Davis, South Mall—Miscellaneous	24
Grove—North Taft—Miscellaneous	18
Grove—Northwest Lippitt—Miscellaneous	21
Lawn around Watson House—Miscellaneous	18
Road to Athletic Field—Ash	62
Memorial Grove—Red Oak	23
Black Walnut Grove	32
Oak Grove	50
Evergreens on Road to Gymnasium	6

NUMBER AND KINDS OF TREES REPRESENTED ON OUR CAMPUS
APRIL, 1934

1	Beech, Purple
1	Weeping Beech
1	Kentucky Coffee Tree
64	Ash
122	American Elm
5	Hemlock
2	Horse Chestnut
39	Linden
1	Redbud
1	Red Maple
1	Norway Maple
119	Sycamore
32	Black Walnut Grove
20	Norway Spruce
50	White Oak
23	Red Oak
5	Pine
2	Sour Gum
1	Pitcher Ash
1	Camperdown Elm
1	Catalpa
6	Larch
1	Locust, Thorny
2	Tulip
1	Hackberry
1	White Birch
1	English Elder
2	Sweet Gum

Total	505
Kinds represented	27

Personnel

The following personnel was added to the Faculty during the year:

Igor I. Sikorsky was appointed Visiting Professor of Aeronautical Engineering.

Mr. Sikorsky was born in Kiev, Russia, in 1889. From childhood he evinced interest in mechanics. After graduation from the Kiev High School he entered the Naval Academy in Petrograd. From the General Course at the Naval Academy he went to Paris, where he studied mathematics, chemistry, and draftsmanship. Returning to Kiev, he entered the Polytechnical Institute and was graduated in 1908. Soon afterward his first helicopter appeared. In 1910 the second helicopter built by him, equipped with two propellers, reversing in opposite directions, could lift itself but did not possess sufficient power to lift the pilot. That same year Mr. Sikorsky built his first airplane, S-1, with a motor of 15 H.P. This machine could part from the ground supported by wing. Step by step, using every new scientific method, Mr. Sikorsky continued his program in multimotored airplane construction. His services to Russia and the allied cause during the War were invaluable. All told, seventy-five of his large bombing planes were delivered to the Russian Government, and only one was shot down by the enemy during more than 400 flights over enemy territory.

After the debacle in Russia, Mr. Sikorsky fled to France and was immediately commissioned to build bombers. He came to the United States in 1919. By sheer dint of ability and persistency, he and a group of his fellow countrymen organized a company in 1923 that has developed into the well known Sikorsky Aviation Corporation.

Mr. Sikorsky is a world figure in aviation and is one of our country's outstanding designers of airplanes. He was the recipient of the Howard N. Potts Medal from Franklin Institute in 1933 for outstanding services to aviation.

Victor H. Noll was appointed Professor of Education and Psychology.

Dr. Noll received his B.S. degree from Pennsylvania State College in 1922, his M.A. degree from University of Minnesota in 1927, and his Ph.D. from the same university in 1929. For three years he was assistant principal at Bloomsburg High School, Pennsylvania. During 1925-26 he was a chemist in the Pittsburgh Testing Laboratory. From 1927 to 1930 Dr. Noll held positions as instructor in chemistry, assistant in educational psychology at the University of Minnesota. He was in the United States Office of Education as a specialist on School Organization until 1932, and he attended the Teachers' College Institute of School Experimentation as research associate until 1934. He has held summer and other temporary positions at George Washington University; Montclair, N. J., State Teachers' College; Syracuse University; and West Virginia University. Dr. Noll is a member of the American Association for the Advancement of Science (Fellow); of the American Association of University Professors; of the American Psychological Association; of the National Association for Research in Science Teaching; of the National Society for the Study of Education; and of Phi Delta Kappa. He belongs to Sigma Pi (social), Phi Mu Alpha (honorary musical). He has published in many magazines, among which are the *Journal of Educational Psychology, Journal of Chemical Education, School and Society, Journal of Applied Psychology,* etc.

Arthur L. Walker was appointed Professor of Agricultural Economics.

Professor Walker was graduated from Iowa State College in 1921, with the degree of B.S. in Farm Management. Previous to graduation —summer of 1920—he was assistant County Agent, Mahaska County, Iowa. From December, 1920, to March, 1921, and from June, 1921, to September, 1922, he was assistant Extension Professor of Farm Management, Iowa State College. In 1922 he was granted a scholarship at the University of Wisconsin, from which institution he received a M.S. in agricultural economics in 1923.

Professor Walker was head of the Department of Poultry Husbandry, New Mexico State College, 1923 to 1925. Prior to coming to Rhode Island he was Head of the Department of Agricultural Economics (1925-34) at New Mexico State. He was Research Assistant, Soil Erosion Service, United States Department of the Interior, for two months. He has published many bulletins on economic phases of agriculture. He is a member of Pi Gamma Mu, national social science honor society.

William R. Gordon was appointed Professor of Sociology and Research Professor of Rural Sociology.

Professor Gordon was graduated from West Virginia University in 1917 with a B.S. in Agriculture. He became a county agent in Montana. In the work there he demonstrated the importance of those features of an educational program that deal with the human values in agriculture. He was one of the first in the field to develop the work in rural recreation, later to become an important phase in the country-wide program in rural sociology. He was made a member of the Summer School faculty of the Montana State College, offering for the first time there courses in rural community enterprises and in rural leadership.

In 1922 he was elected to the faculty of the Pennsylvania State College where he became Professor of Extension Sociology. Here he carried on a broad program of assistance for organized groups such as community associations, granges, 4-H Clubs, and rural church groups. He has written and lectured extensively on problems of rural life and of community organization and has been associated with the research staff of Pennsylvania State College in their studies in the latter field. He is the author of a wide assortment of materials for organizations to use in their programs.

Professor Gordon has pursued graduate study in sociology at Columbia University, University of Minnesota, and Cornell University.

Charles J. Fish was appointed Assistant Professor of Zoology.

Dr. Fish attended Brown University, receiving the degrees of Ph.B., in 1921, S.M. in 1922, and Ph.D. in 1923. As an undergraduate he was elected to Phi Beta Kappa and Sigma Xi, and was appointed James Manning Prize Scholar, Henrietta Morse Scholar, and Arnold Biological Fellow. In 1922 he was appointed a Morgan Edwards Fellow and granted $1000 for research. He was also appointed an Austin Teaching Fellow in zoology at Harvard University but declined the appointment. In 1920-21 he was undergraduate assistant in embryology and in 1921-22 he was graduate assistant in Paleontology. He was also instructor in embryology. In 1922 he was appointed marine biologist for the United States Bureau of Fisheries and carried on research in the North Atlantic until 1927, when he resigned to become Director of the Buffalo Museum of Science.

While in the government service, Dr. Fish carried on ocean investigations in Long Island Sound, Buzzards Bay, Massachusetts Bay, Gulf of Maine, Georges Banks, and the Gulf Stream. During this period he also served as zoologist on the International Ice Patrol (1924) and the Arcturus Expedition (1925). Between 1928 and 1931 under the auspices of the Buffalo Museum he directed the "Cooperative Investigation of Lake Erie," and the "Cooperative Investigation of Frenchman's Bay," He also participated in the Princeton-Buffalo Expedition to the Bahamas (1928), the New York Zoological Society Expedition to the Bermuda region (1929), and the International Expedition to the Bahamas (1930). Prior to joining the faculty at Rhode Island State College, Dr. Fish served for two years as Executive Secretary and Senior Biologist of the International Passamaquoddy Fisheries Commission in an oceanographic investigation of the Bay of Fundy and Gulf of Maine. He also laid out oceanographic programs for the Putman-Bartlett Expedition to Hudson Bay (1929), the Austin Expedition to Baffin Island (1929) and the Byrd Antartic Expedition (1929-1930).

He is a member of the Board of Directors of the Princeton Summer School of Geology and Natural Resources, an Associate in the Department of Tropical Research of the New York Zoological Society, a Fellow of the American Association for the Advancement of Science, a Fellow of the American Geographical Society, a member of the Corporation of the Bermuda Biological Station, and a member of the American Geophysical Union of the National Research Council, Dr. Fish has also served as President of the Niagara Frontier Research Council and Research Professor of Ichthyology at the University of Buffalo.

George E. Brooks was appointed Assistant Professor of Public Speaking.

Mr. Brooks received his B.S. degree from Dartmouth in 1922, his

B.L.I. degree from Emerson College of Oratory in 1927, and his M.A. degree from William and Mary in 1930. For two years he was an instructor in Public Speaking at Lake Forest College; and for five years he was an Associate Professor of Public Speaking at William and Mary. He has also done graduate work at Harvard in psychology and public speaking. While a student at Dartmouth he was interested primarily in debating and was twice awarded the Lockwood Prize for excellence in debate. During the summer of 1934 he served as Assistant to the President at Emerson College.

Herbert M. Hofford was appointed Assistant Professor of Journalism.

Mr. Hofford was graduated from Brown University with the Class of 1923, having previously attended Lehigh University for two years. After graduation he was assistant to the make-up editor of the Philadelphia *Evening Bulletin,* and then he joined the staff of the Providence *Journal* and *Bulletin,* where he served from 1925 to 1928 as reporter, rewrite man, and suburban news editor. From 1928-30 he was field promotion man for the Pictorial Review Company. In 1930 he was appointed assistant professor of journalism at Pennsylvania State College. He has taught three summer schools at Pennsylvania State and during the summer of 1934 conducted an experimental journalism course at Rhode Island State College, when, for the first time, a summer *Beacon* was issued weekly by the journalism students.

Professor Hofford organized the School Press Exchange at Penn State for the improvement of scholastic journalism among the high schools of that state. He is a member of Sigma Delta Chi, professional journalism fraternity; Pi Delta Epsilon, collegiate publications fraternity; Alpha Delta Sigma, professional advertising fraternity; and of Theta Chi, social fraternity.

He has had work published in the *American Mercury, Life, Judge,* and numerous trade magazines, and has written special features for the Baltimore *Sun,* the Boston *Herald,* the Boston *Post,* and other leading newspapers.

Kenneth L. Knickerbocker was appointed Assistant Professor of English.

Dr. Knickerbocker received his B.A. degree from Southern Methodist University in 1925 and, appointed to a graduate scholarship, he received his M.A. from the same institution in 1927. In 1926 he became instructor in English at Texas Technological College. In 1927 he assisted in the organization of courses in English designed for technical students. Granted a leave of absence in 1929, he pursued graduate work in English at Yale University and received his Ph.D. in June, 1933. He was the recipient of a University Scholarship at Yale. In 1934 the American Council of Learned Societies voted him a Grant to be used in the editing of a group of unpublished Browning letters. He will continue his editorial work and plans to have a volume ready for publication by the end of the summer of 1935. Dr. Knickerbocker's publications include articles on Rosetti, Swinburne, and Robert Browning printed in the *Sewanee Review, Studies in Philology,* and *Philological Quarterly.* During his undergraduate days, Dr. Knickerbocker won four letters in tennis and was captain and manager of the team during his senior year. Later he coached tennis for three years at Texas Tech.

Jasper E. Brady, Jr. was appointed Assistant Professor of Military Science and Tactics.

Captain Brady, the son of Colonel Jasper E. Brady, was born in army at Fort Wayne, Michigan. He enlisted in the army at the outbreak of the World War while attending Montclair, N. J., High School. When he was a first sergeant he attended the Officers' Training School at Camp Dix. Captain Brady was commissioned a 2nd Lieutenant in France after going overseas with the 78th Division, was graduated from the 3rd Corps School in Clamacy, France, and went into the army of occupation with the 39th Infantry, 4th Division, to Coblenz, Germany. He returned to the United States in August, 1919, and served at various posts on the east and west coast, including a tour of riot duty at Gary, Indiana, during the steel strike. During his early service he attended and graduated from the army physical directors school, and Corps gas and musketry schools. Captain Brady was graduated from the Infantry School, Fort Benning, Georgia, with the Class of 1921. He served overseas tour in the Philippine Islands from 1927-1930. He was promoted to the grade of Captain Infantry, in

September, 1934, while serving in 26th Infantry at Plattsburg Barracks, New York.

William M. H. Beck, Jr. was appointed Instructor in Physical Education.

Mr. Beck matriculated at Rhode Island State College in 1920. In 1922 he transferred to Providence College and was graduated with a Ph.B. in 1924. At both colleges he played varsity football, baseball, and basketball. He attended the Harvard Summer School of Physical Education 1927, 1928, and 1929. In 1932-33 he attended Boston University and completed the requirements for his Ed.M. with the exception of his thesis. He has taught history, coached athletics and directed physical education programs at the Holderness Preparatory School, Plymouth, New Hampshire, and at the Carteret Academy, Orange, New Jersey. He has also had considerable experience as a swimming instructor, having held positions with the Massachusetts Humane Society and the Southampton Club.

Helen E. Boardman was appointed Assistant in Physical Education.

Miss Boardman was graduated from Posse-Nissen School of Physical Education as valedictorian of her class. She was awarded the Physical Education scholarship offered by the school for excellency in practice work and was also elected a member of Pi Nu Sigma, honorary scholastic society. She was a member of the varsity hockey and basketball teams for two years. Miss Boardman has assisted in physical education work, including the coaching of hockey and basketball, in the public schools of Braintree, Massachusetts. For the past three years she has been rated by the Women's National Officials Rating Committee as an official in Women's Major Sports.

J. James Devine was appointed Assistant in Engineering.

Mr. Devine is a graduate of Rhode Island State College, having received the degree of B.S. in Civil Engineering in 1927, as well as membership in the honor society of Phi Kappa Phi. His engineering experience consists of four years as Plant Engineer with the New York Telephone Company and three years of construction work. In 1931 he entered Brown University Graduate School and is now completing requirements for the M.S. degree. Mr. Devine was a student at the Rhode Island College of Education for two years. Previous to his appointment, he had two years of practice and experience as a teacher of mathematics and mechanical drawing in the Providence Junior and Senior High Schools.

During the year the following resignations were accepted:

Dr. F. C. Wooton to become President of the Chevy Chase Junior College, Washington, D. C.

Albert D'Orsi to become instructor in mathematics and science at Chevy Chase Junior College.

Dr. Roger B. Corbett to become Senior Agricultural Economist, United States Department of Agriculture, Washington, D. C.

French M. Hyre to become Economist under the A. A. A.

Dr. Irving L. Churchill to become Associate Professor of English at Bucknell University.

Miss Hope Jillson to become Mrs. Arthur A. Vernon.

Mrs. Winifred M. Keaney, because of ill health.

The following changes in official positions were approved:

Frederick Delmont Tootell, Associate Professor of Physical Education.

Everett Percy Christopher, Associate Professor of Horticulture.

Nicholas Alexander, Assistant Professor of Aeronautical Engineering.

Edson Irwin Schock, Assistant Professor of Mechanical Engineering.

Robert Rockafellow, Assistant Professor of Economics.

Maurice William Almfeldt, Assistant Instructor in Engineering.

Leon Conrad Breault, Assistant Instructor in Engineering.

Leonard Herbert Russell, Assistant Instructor in Economics

Harry Jacob Prebluda, Assistant Instructor in Chemistry.

Publications and Addresses by the College Staff

The following is a partial list of the publications and major public addresses, exclusive of agricultural extension, by members of our teaching and research staffs.

ADAMS, W. L., and KNOWLES, A. S., JR.—Inspection of feeds. Annual Feed Circular, May, 1934.

Inspection of fertilizers. Annual Fertilizer Circular, September, 1934.

CARLETON, R. K.—"Experiments in Inorganic Chemistry"—a manual for Freshmen.

CHRISTOPHER, E. P.—The intensity of light striking leaves of apple trees at different times of day. Presented before American Society Horticultural Science.

Lessons from the severe winter of 1933-34 in Rhode Island. Presented before Massachusetts Fruit Growers' Summer Meeting at Westboro, Massachusetts, August, 1934.

Winter injury in Rhode Island as of July 1, 1934. Prepared for Federal Land Bank of Springfield, Massachusetts, on basis of thirty-one orchard visitations, to be used by Farm Credit Administration in deciding on help to be given stricken orchardists.

CRANDALL, F. K.—Results obtained from rotating and fertilizing vegetables. Presented before Connecticut Vegetable Growers' Association.

COYNE, S. E.—Home Economics Organization in Rhode Island. Radio talk, WJZ, New York, February, 1934.

DELAPLANE, J. P., ERWIN, L. E., and STUART, H. O.—A Hemophilic bacillus as the cause of an infectious rhinitis. Rhode Island Agricultural Experiment Station Bulletin 244.

DELAPLANE, J. P., and STUART, H. O.—The survival of avian coccidia in soil. Poultry Science.

DICKSON, M. E.—"Unemployment in Rhode Island."

DURHAM, G. B.—Propagation of Evergreens Under Different Temperatures at Different Times of the Year. American Society for Horticultural Science, published in proceedings—also in American Nurseryman.

FISH, C. J.—Report on Results of International Survey of Lake Erie. U. S. Bureau of Fisheries.

GILBERT, B. E.—Normal crops and the supply of available soil manganese. R. I. Agricultural Experiment Station Bulletin 246.

Vitamin Research in Northeastern Experiment Stations. Presented at meeting of Northeastern Directors.

New England Research Agencies and the New England marketing program. Presented before New England Council.

Possible effects of A.A.A. programs on New England Agriculture. Presented before Vermont Farm and Home Conference.

Gilbert, B. E., and Pember, F. R.—Tolerance of certain weeds and grasses to toxic aluminum. Soil Science.

Gordon, W. R.—Prospecting for talent with the Grange Lecturers. Presented before National Grange, Hartford, Connecticut.

Program Making. Presented before Conference of Grange Lecturers of the State.

Kinney, L. F., Jr.—National Conference of State 4-H Club Leaders at National 4-H Camp, Washington, June, 1934. Director of 4-H program at Chamber of Commerce of the United States, June 19.

Knickerbocker, K. L.—"Browning's Cenciaja," Philological Quarterly, October, 1934.

"An Echo of Browning's Second Courtship," Studies in Philology, January, 1935.

Kuschke, B. M.—Report on school children's food habits in Rhode Island. Presented before Presidents' Club in the Organization of the Federated Women's Club.

Noll, V. H.—Paper on "The Extent of Chemical Education" read before joint session of the Division of Chemical Education of the American Chemical Society and the American Association for the Advancement of Science, Pittsburgh, Pennsylvania, December, 1934.

Paper on "Measuring the Scientific Attitude" read before Section I (Psychology) of the American Association for the Advancement of Science, Pittsburgh, Pa.

North, H. F. A.—Control of brown patch and dollar spot in treated and untreated turf. Presented before Massachusetts Recreational Conference, Golf Division.

Habits of webworms and control of insect pests in greens. Presented before New England Greenkeepers' Club.

North, H. F. A., and Odland, T. E.—The relative seed yields in different species and varieties of bent grass. Presented before American Society of Agronomy.

Seed yields of Rhode Island Colonial bent (Agrostis tenuis, Sibth) as influenced by the kind of fertilizer applied. Journal of American Society of Agronomy.

Odland, T. E.—Potatoes and crops rotation. Presented before Connecticut Vegetable Growers' Association.

ODLAND, T. E., and KNOBLAUCH, H. C.—Long-time comparison of magnesium and calcium limes. Presented before American Society of Agronomy.

The response of potatoes to magnesium under various soil conditions. American Potato Journal.

A magnesium deficiency induced by previous fertilizer treatments. Journal American Society of Agronomy.

ODLAND, T. E., SMITH, J. B., and DAMON, S. C.—The influence of crop plants on those which follow. IV. R. I. Agricultural Experiment Station Bulletin.

ODLAND, T. E., and NORTH, H. F. A.—Putting green grasses and their management. Rhode Island Agricultural Experiment Station Bulletin.

ODLAND, T. E., and CRANDALL, F. K.—Response of early cabbage to manures and fertilizers. Journal American Horticultural Science.

PARKS, W. G.—"The Partial and Integral Heats of Dilution of Cadmium Sulfate from Electromotive Force Measurements." Journal of American Chemical Society, November.

"The Temperature Coefficients of the Electromotive Force of the Cell Cd (metal), $CdSO_4$, Cd (sat. Amalgam)." Journal of American Chemical Society, January.

PREBLUDA, H. J.—"The Cobalt Hexammine Compounds in the Gravimetric determination of Vanadium." Before the Board of Editors of Industrial and Engineering Chemistry.

ROCKAFELLOW, R.—"The Collection of Local Taxes in the State of Rhode Island and Providence Plantations."

RUSSELL, L. H.—"The Growth of Trade Union Membership in Rhode Island, 1912-1919."

SMITH, J. B.—Report on high analysis fertilizers. Journal Association Off. Agricultural Chemistry.

Report on high analysis fertilizers. Presented before Association of Official Agricultural Chemists.

SMITH, J. B., and SCHLENKER, F. S.—Optimum soil-nitrate levels for table beets: Their effect on certain nitrogen-fractions in juice expressed from the leaves. R. I. Agricultural Experiment Station Bulletin.

STENE, A. E.—Preliminary studies in the fertilization of red raspberries. Journal American Horticultural Science.

STUART, H. O.—Leghorns at the Rhode Island Contest. Published in the New England Poultryman, March, 1934.

STUART, H. O., and CHARLES, T. B., of New Hampshire—Commercial Poultry Farming. Published by Interstate Printing Company.

TENNANT, J. L.—The cost of producing milk in Rhode Island. Rhode Island Agricultural Experiment Station Bulletin.

WHITTEMORE, M.—Led symposium on Home Economics Curriculum Studies in Land Grant Colleges. Presented before Home Economics Department of Land Grant College meeting.

WILLARD, D. R.—A study of methods of measuring the growth rate of plants while growing. New England Section of American Society of Plant Physiologists.

Forty-sixth annual report of the Director. Bulletin of Rhode Island State College 29.

Radio talks on Rhode Island 4-H Work. All of these are nationwide hook-ups. WBZ, Boston, November 3, 1934. WJZ, New York, January 5, 1935.

Aeronautical Engineering

The most outstanding development in the program of instruction during the year is the inauguration of an elective in Aeronautical Engineering under the general supervision of Professor I. I. Sikorsky. Credit for this work is largely due to Dr. Nicholas Alexander, who has given an enormous amount of time and thought to the development of a program of study and to the creation of a laboratory for this purpose.

An aeronautical laboratory consisting of two rooms—each measuring approximately sixty feet square—on the top floor of Bliss Hall and presenting the appearance of a miniature airplane factory was set up during the summer. The apparatus which the State College has acquired title to includes an amphibian, the S-39, a five-passenger Sikorsky cruiser. A working airplane is being set in the laboratory. It consists of the cockpit with all the controls and the wings and tail surfaces of the S-36, a large Sikorsky machine. There is a wind tunnel built to accommodate a six inch model which will develop a wind velocity of about fifty miles, and there are many demonstrations of the effect of streamline flow in air and in water. Machines testing strength of airplane spars and wing ribs are designed and are made in full scale. Corrosion tests are being conducted to determine the effect of corrosion on different metals. This device subjects the material tested to alternate salt water baths and exposure in the open air automatically. A photoelasticity machine to test the stress on translucent material by means of polarized light is set up for research work conducted by graduate students. There is a model demonstrating the effect of wing vibration. A special movable platform with the navy compasses was made for graduate students to study the methods of compensation of magnetic compasses. A variety of aircraft instruments, numerous propellers, four airplane engines, electric motors, and at least 1000 of the latest books, leaflets, and booklets on aviation brings up the value of the aeronautical equipment to at least $20,000.

This equipment which Dr. Alexander has been able to procure at a very small expense to the college and to have constructed at the college is quite remarkable. It is the thought that this work should be offered only to seniors, since they alone have a reasonable background for the study, and further, that this work should be restricted to those whose previous records indicate adaptability to the work.

Student Activities

There are many problems naturally that one might discuss under the head of student affairs. I have in mind, however, stressing only a few very significant things, as I view them.

The STUDENT GOVERNMENT set up two years ago, known as the Sachems, is beginning to function smoothly. The students as a whole appreciate the value of an organization non-political in nature to control their affairs. To review briefly, I might say that membership on the Sachems is gained not by popular election but by high scholarship and activities engaged in during the three years prior to the senior year. Our whole scheme of activities from scholarship to athletics is rated numerically, and those seniors who at the end of their junior year have acquired the highest number of points automatically become members of the Sachems and the Supreme Governing Board of the students of the college. They have had numerous problems and are to be congratulated on the wisdom shown in their handling of these problems. An effort is now being made to develop a plan for financial supervision for the *Beacon,* the college weekly, and for the *Grist,* the college annual, in order that the recurring embarrassments due to financial problems may be minimized. The President has repeatedly said that he will not censor any student publication but that he will hold the students responsible for whatever appeared in the publication. This policy seems to be working well. Faculty supervision is provided for all major student activities, and it is supervision, not domination, except along budgetary lines. Experience here suggests that a rather firm control should be exercised.

* * * *

Another student problem that has received considerable thought during the year is the matter of *Athletic Awards for Girls*. According to the old point system of awarding R. I. sweaters to the girls, a girl had to play on every team in every sport (hockey, basketball, track, baseball, tennis, etc.—class and varsity) for at *least* three years in order to accumulate the required 150 points for an R. I. sweater. This has limited the number of girls to not usually more than two a year (seniors) who have received an R. I. sweater. The Women's Athletic Association and the Women's Athletic Council are inaugurating a new system whereby girls *may* earn an R. I. sweater by playing two years on a regular team.

At the end of each hockey and each basketball season, regular teams will be selected by the coaching staff. Only regulars (after two years' participation) of hockey and basketball are *eligible* for sweaters, since hockey and basketball are the only competitive inter-collegiate sports under the Women's Athletic Association. Girls are eligible for sweaters, also, if they play two years on the varsity squad plus one year on the regular team. Even though the girls may be eligible for R. I. sweaters, the Coach must award the insignia. And the Coach will base a girl's worthiness upon the following: sportsmanship, training, regularity at practices, effort, participation in games.

In order to stimulate interest in track, baseball, and tennis—for which sweaters cannot be earned—points will be awarded toward a cup. This cup will be the highest honor a girl athlete can receive. This cup designates an all-round athlete and cannot possibly be earned until the senior year. Ten points equals a cup. The points toward a cup may be secured as follows:

1. Two years honorary varsity track—1 point. Any season after the first point in honorary varsity track has been earned—1 point each season.
2. Any season on the regular basketball team—1 point each season.
3. Any season on the regular hockey team—1 point each season.
4. Two years regular baseball team (regulars to be selected from all classes in the inter-class competition)—1 point. Any season on the honorary regular baseball team after the first point has been earned—1 point each season.

5. College Tennis Champion—1 point per season (sophomores, juniors, seniors eligible).

NOTE: Only one spring sport (track, baseball, or tennis) may be selected for which to receive points towards cup.

Numerals will be presented to girls participating for three years on any class team in the same sport. These class teams cannot practice during the regular gym period.

Managers must be seniors. The managers of hockey and basketball are eligible for a sweater with a smaller R. I. (or an R. I. with an "M") when they are seniors, if they have been assistant manager for two years.

The small individual track cup presented to the girl making the highest number of points in the track meet will still be given each year. Cups will also be awarded to winners in the intra-mural series of games each season.

* * * *

This year marked the beginning of expanded efforts along *musical* lines. The Men's and Women's Glee Clubs with the college orchestra studied and presented two performances of the light opera, "The Mikado," by Gilbert and Sullivan. This, we think, received favorable comment and attracted people to the college.

The Orchestra gave an evening concert in Edwards Hall and one in assembly The Band started the custom of holding an open air concert during Commencement Week. Our main objective was the establishment of an Annual May Music Festival to be held at the college. Two concerts were given in May. The first evening the Providence Symphony Orchestra played, and the second evening a Festival Chorus of almost 300 (a majority of this number being college students) presented a choral work. The accompaniments for this work were played by the college orchestra augmented with Providence Symphony players.

During the summer session twelve vesper services were held on Tuesday and Thursday afternoons. These services attracted many to the college campus.

The fall semester has seen two major concerts projected. One was for the State Grange held in the Elks Auditorium in Providence.

The orchestra, men's and women's glee clubs, and a mixed choir totalling 116 students presented a concert. This concert has aroused the interest of the Grange members in the state about the college, and we hope that a mutual sympathetic understanding may be maintained. The mixed choir of eighty voices presented a second Annual Christmas Concert. This year a varied program of Christmas music was presented, closing with excerpts from "The Messiah," by Handel.

The class work is growing in interest and a larger enrolment may be expected in the theoretical and applied music subjects.

Placement Service

The Placement Service of the college is functioning as satisfactorily as can be expected under present economic conditions. It has developed along four distinct lines: (1) Service to the graduating class. Most of the 1935 class were registered, and each one was provided with ninety copies of a personal data sheet—which included a picture of the registrant, information concerning his college work, extracts from his testimonials. It was thought that these would be very convenient for him in later years wherever he might make application for a position. The total cost for this service was $300, exclusive of labor cost—half of which was paid by the college and half by the seniors themselves. (2) Service to our graduates. An effort was made by the Placement Officer—mainly by letter—to find opportunities for our graduates. The plan consisted of sending out letters somewhat early in the season making inquiry for possible openings and, wherever a lead was secured, following it up with suggestions or bringing the employer and the employee in personal contact. In this connection it possibly would be worth very much more to have our representative visit various concerns of the state with a view of helping our graduates find employment. Our financial limitations, however, render this unfeasible. (3) The dissemination of employment information among alumni. Throughout the year continuous attention to the United States Civil Service announcements of examinations was had, and alumni were kept informed. As many as 150 copies of certain announcements have been mailed out. The alumni, themselves, who are receiving this service indicate that they desire to have it continued. (4) Efforts made to ascertain the present employment status of our alumni. A brief questionnaire was sent out to all of the recent graduates; only about fifty percent of the group replied. The results, however, seemed to justify the continuation of our efforts along this line.

The results of the placement work during the past two years definitely point to several conclusions, the chief of which is the need of greater personnel to carry the work. It is likely that it is a full time job, and sooner or later we should face this situation. At present, Dr. Newman handles this in connection with his regular work.

New Construction

The new construction work during the past year consisted mainly of minor projects. The new concrete grandstand—with a seating capacity of 1500—cost about $9,000. This is an investment that was financed entirely from student athletic returns and will prove to be a profitable one in the years to come. The enlarged program in athletics naturally will attract more people, with an attending increased financial income. Three new concrete tennis courts for girls were erected immediately back of the girls' sororities in the women's section of the campus. This is the first development in that part of the campus that ultimately will become the girls' playing field. Construction here is rather expensive due to the uneven terraine. Several new sidewalks were built, the large ditches that were open two years ago in order to bury the boulders of the campus have now been filled and covered over so that the passerby doesn't realize what a tremendous deposit of granite might be found two feet beneath the surface of the campus. The Phi Beta Chi fraternity completed a very beautiful and substantial home on the south west campus. The cost of this building aggregated $27,000. The student rooming capacity is 38. I should say in passing that were it not for these fraternity buildings on the campus, the college would not be able to handle more than half the students that we now have. The liberal policy of the state in endorsing a loan for these organizations has certainly proved beneficial both to the state and to the college.

Land

During the summer the college acquired by purchase about four acres of valuable land fronting on Thirty Acre Pond. This land had been rented by the college for several years, during which time most valuable experimental grass plots were developed. It was high time that the college acquired ownership.

Student Aid

About twenty percent of the students of Rhode Island State College are receiving direct assistance either from college funds or through FERA funds. I do not wish to discuss either the merits or the demerits of federal aid. I have this to say, though. Without this assistance many of our students would be unable to continue in college. The aid received is not sufficient to pay more than their room rent and incidentals, but that very amount represents the difference between remaining in college or leaving college and joining the ranks of the unoccupied. Some colleges have received special grants from their state legislatures to be used for student employment services for the college. This is a matter to which the Board of Managers might give some serious thought. It occurs to me that a Loan Fund for the college might very well be established by the Legislature. An appropriation of $10,000, for instance, could be made available, to be used as loans to needy students in the junior and senior classes. These loans would become a revolving fund—distributed on the same basis as our small Alumni Loan Fund is now distributed. In the course of time, if judiciously managed, this fund would grow and would supply a great need. At present the total of all our scholarships and loan funds is insignificant—less than $1,500.

Gifts and Scholarships

The most outstanding gifts received by the college during the year were from the Sikorsky Aviation Corporation (see page 24). The Pratt and Whitney Corporation, through the instrumentality of Mr. Theose Tillinghast, gave the college one airplane motor. Two airplanes engines, a steam drive air compressor and a sectional automobile chassis were received from M.I.T. Mr. Frederick Peck donated several hundred volumes to the Library. Mrs. F. D. Tootell presented to us the special Memorial Edition, Progress of Nations. Mr. Moses Burpee completed our files of the proceedings of the American Society of Civil Engineers and likewise contributed a number of other volumes valuable as references for engineering students. Vice Consul for Italy at Providence, V. Verdorosa, presented 250 volumes of outstanding Italian Literature. Two scholarships in voice were received from Miss Julia Gould.

Respectfully submitted,

RAYMOND G. BRESSLER,
President

January 15, 1935

TABLE NO. 1

Report of the Registrar

Attendance

Showing Attendance by Classes during years 1930-1934

CLASS	1930-31	1931-32	1932-33	1933-34	1934-35
Graduate	2	7	21	32	27
Senior	97	127	121	135	186
Junior	152	147	165	207	248
Sophomore	162	184	239	294	237
Freshman	217	319	366	310	377
Irregular	15	13	11	24	21
Total	645	797	923	1,002	1,096

TABLE NO. 2

Showing Number of Men and Women and of New and Previous Matriculates, by Classes for Collegiate Year 1934-1935

CLASS	Sex		Date of Matriculation	
	Men	Women	Previous to 1934	1934
Graduate	21	6	24	3
Senior	148	38	186	0
Junior	177	71	247	1
Sophomore	167	70	234	3
Freshman	283	94	41	336
Irregular	8	13	10	11
Total	804	292	742	354

TABLE NO. 3

Showing Distribution of Students in Curricula Leading to B.S. Degree during 1934-1935

Class	Agric.		Engineering							Sci.		Home Ec.	Bus. Ad.		Phys. Ed.	Total
			Civil	Chem.	Elec.	Mech.		Total								
	M.	W.	M.	M.	M.	M.	W.	M.	W.	M.	W.	W.	M.	W.	M.	M. & W.
Senior	13	0	11	7	19	14	0	51	0	45	5	23	39	10	0	186
Junior	18	2	19	14	13	19	1	65	1	46	18	37	39	13	9	248
Sophomore	20	0	7	10	14	25	0	56	0	50	11	49	36	10	5	237
Freshman	37	1	....	....	....	....	....	92	1	84	11	64	63	17	7	377
Total	88	3	37	31	46	58	1	264	2	225	45	173	177	50	21	1,048

Home Residence of Students Enrolled in Four-Year Courses

A. Resident outside of the State:

Connecticut:	
Groton	3
Mystic	1
Naugatuck	1
New London	2
Old Saybrook	3
Poquonock Bridge	1
Stonington	3
Wallingford	1
	15

Illinois:	
Oak Park	1
Wheaton	1
	2

Maine:	
North Waterford	1
Portland	3
South Portland	3
	7

Massachusetts:	
Attleboro	4
Attleboro Falls	1
Auburndale	1
Belmont	1
Brockton	4
Canton	1
Chicopee	2
Dorchester	2
Fall River	8
Foxboro	1
Gardner	1
Holyoke	2
Hopedale	1
Lancaster	1
Mansfield	1
Mattapan	1
Melrose	1
Needham	1
New Bedford	2
Newburyport	1
Newton Highlands	1

North Attleboro	2
Palmer	1
Pittsfield	1
Plainville	1
Provincetown	3
Rehoboth	1
Saxonville	1
Seekonk	1
Taunton	3
Templeton	1
Watertown	1
Willimansett	2
Worcester	2
	58
New Jersey:	
Fairview	1
Long Branch	1
Millington	1
Passaic	1
Roselle Park	1
	5
New York:	
Brooklyn	1
Greenville	1
Long Island City	1
Seneca Falls	1
Unadilla	1
	5
Pennsylvania:	
Drexel Hill	1
Wilkes-Barre	1
	2

B. Resident in Rhode Island by Counties and Towns:

Bristol:	
Barrington	9
Bristol	8
Warren	7
	24
Kent:	
Coventry	6
East Greenwich	18
Warwick	37
West Warwick	14
	75
Newport:	
Jamestown	4
Middletown	1
Newport	66
New Shoreham	6
Portsmouth	4
Tiverton	1
Little Compton	2
	84
Providence:	
Burrillville	5
Central Falls	5
Cranston	85
Cumberland	6
East Providence	45
Foster	1
Glocester	4
Johnston	5
Lincoln	11
North Providence	10
Pawtucket	56
Providence	315
Scituate	4
Smithfield	3
Woonsocket	42
	597
Washington:	
Hopkinton	6
Narragansett	7
North Kingstown	15
Richmond	11
South Kingstown	61
Westerly	74
	174

Total Attendance from within the State	954
Total Attendance from outside the State	94

Preparatory Schools Represented in Freshman Class

In Rhode Island:	
Barrington High	4
Bristol:	
Colt Memorial High	3
Central Falls High	1
Cranston High	26
Cumberland High	2
East Greenwich Academy	4
East Providence High	11
Little Compton High	2
Newport:	
De La Salle Academy	2
Rogers High	13
St. Joseph's High	1
New Shoreham High	5
North Kingstown High	5
Pawtucket:	
Pawtucket High	19
St. Raphael's Academy	2
Providence:	
Central High	54
Classical High	12
Hope Street High	28
La Salle Academy	14
St. Mary's Seminary	1
St. Xavier's Academy	6
South Kingstown High	17
Warren High	3
Warwick High	15
Westerly High	17
West Warwick High	7
Woonsocket High	8
	282
In Connecticut:	
New London—Bulkeley High	1
Norwich—Free Academy	1
Stonington High	3
In Florida:	
Miami Beach—Carson Tropic High	1
In Illinois:	
Oak Park High	1
Wheaton Community High	1
In Maine:	
Charleston—Higgins Classical Institute	1
North Bridgton—Bridgton Academy	1
Portland High	1
South Portland High	1
In Maryland:	
Severna Park — Severn Prep. School	1
In Massachusetts:	
Attleboro High	2
Canton High	1
Dorchester High	1
Fall River—B. M. C. Durfee High	3
Framingham High	1
Franklin—Dean Academy	4
Gardner High	1
Hopedale—Gen. Draper High	1
Mansfield High	1
Newburyport High	1
North Attleboro High	1
Pittsfield High	1
Provincetown High	1
Worcester Academy	1
Classical High	1
In Minnesota:	
White Bear Lake High	1
In New Hampshire:	
Phillips Exeter	1
In New Jersey:	
Weehawken—Woodrow Wilson High	1
In New York:	
Barrytown—St. Joseph's Institute	1
Brooklyn—Eron Prep. School	1
Granville High	1
Lima-Genesee Wesleyan Prep. School	1
Rochester—East High	1
In Ohio:	
Greenville High	1
In Pennsylvania:	
Erie—Academy High	1
Total outside of Rhode Island	44

Total number of students received from high school	327
Total number of students re-classified and repeating work	41
Total number of students transferred from other colleges	9
Total number of students classified as Freshmen	377
Average age of men and women, Oct. 1, 1934	18 years, 11 months, 13 days
Age of oldest member of class, Oct. 1, 1934	29 years, 8 days
Age of youngest member of class, Oct. 1, 1934	15 years, 10 months, 22 days

REPORT OF THE TREASURER

R. S. BURLINGAME, *Treasurer, in account with the different funds of Rhode Island State College for year ended June 30, 1934*

EXPENDITURES JULY 1, 1933, TO JUNE 30, 1934

	State	Current	Trust	Morrill 1890	Morrill 1862	Capper Ketcham	Smith Lever	Additional Federal Co-op. Funds	Totals
Salaries	$134,240.73	$14,083.77	$4,684.18	$50,000.00	$2,500.00	$20,481.83	$9,290.85	$450.00	$235,731.36
Labor	39,532.81	12,382.18	11,214.85						63,129.84
Special Services	226.46	1,312.36							1,538.82
Postage		1,879.02					169.51		2,048.53
Telephone and Telegraph		1,709.56	57.62				.65		1,767.83
Office Supplies		2,615.85	3.44				636.40		3,255.69
Subscriptions		1,128.92							1,128.92
Printing and Binding		3,982.05					190.00		4,172.05
Advertising		205.19							205.19
Travel		2,421.62	619.82				2,514.01		5,555.45
Food			39,910.43						39,910.43
Forage		2,489.49							2,489.49
Fuel	15,637.69	3,551.12	770.05						19,958.86
Light, Power, etc.	6,336.58	1,634.03	348.96						8,319.57
Motor Vehicle Expense		1,432.17							1,432.17
Medical and Surgical		721.47							721.47
Laundry and Sanitary		1,857.42	1,762.81						3,620.23
Educational Supplies	8,256.05	9,199.27							17,455.32
Recreational Expense		2,373.95							2,373.95
Agricultural and Botanical		1,280.13							1,280.13
Miscellaneous		7,538.34	3,250.86						10,789.20
Rental	1,769.68	553.63							2,323.31
Freight and Express		972.99	398.55						1,371.54
Refunds		1,382.80							1,382.80
Transferred to Current Fund			4,479.52						4,479.52
Interest on Federal Funds		7.44							7.44
Books for Store			10,227.62						10,227.62

	State	Current	Trust	Morrill 1890	Morrill 1862	Capper Ketcham	Smith Lever	Additional Federal Co-op. Funds	Totals
Soda Fountain Supplies			1,902.24						1,902.24
Repair Labor	5,642.72	3,026.43	105.60						8,774.75
Repair Materials	4,605.93	5,541.99	116.92				47.16		10,312.00
Repair Contracts	1,332.97	612.00							1,944.97
Replacements	2,418.38	803.68	34.02						3,256.08
Equipment	2,500.00	17,530.57	2,921.10				1,147.81		24,099.48
Permanent Improvements		13,490.81							13,490.81
Land		2,500.00							2,500.00
Buildings—New Athletic House		3,634.78							3,634.78
Special State Appropriation									
New Sewer	2,594.37								2,594.37
New Well	500.00								500.00
Special State Appropriation	$3,094.37								
Total State Maintenance	$222,500.00	$123,855.03	$82,808.59	$50,000.00	$2,500.00	$20,481.83	$13,996.39	$450.00	$519,686.21

RECEIPTS JULY 1, 1933, TO JUNE 30, 1934

	Reserve	State	Current	Trust	Morrill 1890	Morrill 1862	Capper Ketcham	Smith Lever	Additional Federal Co-op. Funds	Totals
Balance brought forward	$4,000.00	$3,094.37	$7,447.20	$9,370.84						$23,912.41
Federal Appropriation					$50,000.00		$20,481.83	$14,432.82	$600.00	85,514.65
Interest for year						$2,500.00				2,500.00
State Appropriation		222,500.00								222,500.00
Dormitory Fees			11,450.21							11,450.21
House Rentals			1,429.61							1,429.61
Department Fees			1,996.50							1,996.50
Department Service			1,126.00							1,126.00
Department Sales			28,655.85							28,655.85
Tuition			10,781.25							10,781.25
Medical Fees			5,575.50							5,575.50
Incidentals			17,525.00							17,525.00
Laboratory Fees			16,733.00							16,733.00
Refunds			76.91	751.82						828.73
Vocational Education				320.00						320.00
4-H Club Deposits			848.90							848.90
Physical Education Fees			1,048.00							1,048.00
Library Fees			5,574.20							5,574.20
Transferred from Trust Fund			4,479.52							4,479.59
Summer School			3,898.00							3,898.00
Miscellaneous			352.11							352.11
Research Grant			300.00							300.00
Military Fees			451.37							451.37
Matriculation Fees			3,180.00							3,180.00
Enrollment Fees			2,015.00							2,015.00
Boarding				57,643.59						57,643.59
Bookstore				14,356.07						14,356.07

	Reserve	State	Current	Trust	Morrill 1890	Morrill 1862	Capper Ketcham	Smith Lever	Additional Federal Co-op. Funds	Totals
Furniture Sales	....	....	....	304.00	....	....	....	....	....	304.00
Herd Testing	....	....	....	1,352.50	....	....	....	....	....	1,352.50
Poultry Testing	....	....	....	1,170.48	....	....	....	....	....	1,170.48
Total Receipts	$4,000.00	$225,594.37	$124,944.13	$85,269.30	$50,000.00	$2,500.00	$20,481.83	$14,432.82	$600.00	$527,822.45
Total Expenditures	....	225,594.37	123,855.03	82,808.59	50,000.00	2,500.00	20,481.83	13,996.39	450.00	519,686.21
Balance on hand	$4,000.00	....	$1,089.10	$2,460.71	....	....	....	$436.43	$150.00	$8,136.24
Reverts to U. S. Treasury	....	....	....	....	....	....	....	436.43	150.00	586.43
Balance carried forward	$4,000.00	....	$1,089.10	$2,460.71	....	....	....	....	....	$7,549.81

AGRICULTURAL EXPERIMENT STATION

EXPENDITURES JULY 1, 1933, TO JUNE 30, 1934

	Hatch	Adams	Purnell	Miscel.	State Feeding Stuffs	State Fertilizer Control	Egg Laying Contest	Totals
Buildings and Land	$280.42	$331.58	$2,625.11	$869.00			$17.65	$4,123.76
Communication Service	104.62	50.00	218.90	293.58	$10.00		152.97	830.07
Contingent Expenses	7.60		15.00	36.43		$5.10	39.96	104.09
Feeding Stuffs	182.54	655.78	1,738.99	417.70			1,467.51	4,462.52
Fertilizers	182.13	153.50	234.07	5.00				574.70
Furniture	81.85		40.65	160.38			9.60	292.48
Heat, Light, etc.	436.63	137.62	730.86	173.67			98.98	1,577.76
Labor	2,963.80	2,697.58	7,898.75	1,657.59		80.00	1,075.66	16,373.38
Library	59.57	5.85	115.59	41.00	10.00	4.00		236.01
Live Stock			36.25	1.30			1.30	38.85
Publications	468.61		465.63	109.32	135.00	21.94	30.00	1,230.50
Salaries	7,781.38	9,938.88	39,415.62		1,000.00	1,570.00	1,477.59	61,183.47
Scientific Equipment	185.73	497.93	1,927.74	29.42				2,640.82
Scientific Supplies, Consumable	229.85	161.27	872.46	9.08	19.95	146.78	12.50	1,451.89
Stationery and Office Supplies	290.94	5.04	52.37	23.99			151.58	523.92
Sundry Supplies	631.26	25.85	345.00	193.45	25.05		49.99	1,270.60
Tools and Machinery	776.32	336.92	2,822.15	164.14		12.04	1.86	4,113.43
Transportation of things	181.50	2.20	42.12	69.80		1.78	2.44	299.84
Traveling	155.25		402.74	441.27	100.00	121.67		1,220.93
Total	$15,000.00	$15,000.00	$60,000.00	$4,696.12	$1,300.00	$1,963.31	$4,589.59	$102,549.02

AGRICULTURAL EXPERIMENT STATION

TOTAL RECEIPTS JULY 1, 1933, TO JUNE 30, 1934

	Hatch	Adams	Purnell	Miscel.	State Feeding Stuffs	State Fertilizer Control	Egg Laying Contest	Totals
Balance brought forward				*$1,007.74		$40.90	*$811.73	*$1,778.57
Federal Appropriation	$15,000.00	$15,000.00	$60,000.00					90,000.00
State Appropriation					$1,300.00			1,300.00
Department Sales				6,329.53			2,361.11	8,690.64
Department Service				225.57				225.57
Department Fees						4,216.00	1,210.00	5,426.00
Refunds				7.92				7.92
Miscellaneous				33.75			22.83	56.58
Total Receipts	$15,000.00	$15,000.00	$60,000.00	$5,589.03	$1,300.00	$4,256.90	$2,782.21	$103,928.14
Total Expenditures	15,000.00	15,000.00	60,000.00	4,696.12	1,300.00	1,963.31	4,589.59	102,549.02
Balance on hand and carried forward				$892.91		$2,293.59	*$1,807.38	$1,379.12

---

*Dr.

I hereby certify that the above is correct and true, and truly represents the details of expenditures for the period and by the institution named.

R. S. BURLINGAME,
Treasurer.

This is to certify that we, the undersigned, Auditing Committee of the Board of Managers of Rhode Island State College, have examined the accounts of R. S. Burlingame, Treasurer of said college, and find the same correct.

THOMAS G. MATHEWSON,
CHARLES ESTES,
WILLIAM C. CLARKE,
Auditors.

Summaries Dealing with Receipts and Expenditures
For the Year Ending June 30, 1934

Balance brought forward July 1, 1933	$22,133.84
Total income during year	609,616.75
Total	$631,750.59
Total expenditures during year	622,235.23
Balance on hand June 30, 1934	$9,515.36
Unexpended balance reverting on Federal Funds	586.43
Balance carried forward July 1, 1934	$8,928.93

INCOME

Income from Students:

Tuition fees	$10,781.25	
Matriculation and incidental fees	20,705.00 ✓	
Dormitory fees	11,450.21 ✓	
Medical fees	5,575.50 ✓	
Laboratory fees	16,733.00	
Physical Education fees	1,048.00	
Library fees	5,574.20 ✓	
Summer School	3,898.00	
Dining Halls	57,643.59 ✓	
Store Sales	14,356.07 ✓	
Department fees	4,462.87	
		$152,227.69

Income from State and Nation:

State Maintenance	$222,500.00	
Morrill Act of 1890	50,000.00	
Morrill Act of 1862	2,500.00	
Hatch Act of 1887—Experiment Station	15,000.00	
Adams Act of 1906—Experiment Station	15,000.00	
Purnell Act of 1923—Experiment Station	60,000.00	
Smith-Lever Act of 1914—Extension	14,432.82	
Capper-Ketcham Act of 1928—Extension	20,481.83	
Additional Federal Co-op. Funds—Extension	600.00	
		$400,514.65 ✓

Income from Other Sources:

Department Sales and Service	$32,608.83
Transferred from Trust to Current Fund	4,479.52

Refunds	828.73	
Vocational Education	320.00	
House rentals	1,429.61	
Miscellaneous	1,201.01	
Research Grant	300.00	
		$41,167.70 ✓

Income from Experiment Station:

Department Sales and Service	$6,555.10	
Refunds	7.92	
Miscellaneous	33.75	
		$6,596.77 ✓

Income from Regulatory Funds:

State Feeding Stuffs Inspection (appropriation)	$1,300.00	
State Fertilizer Control (fees)	4,216.00	
Egg Laying Contest, Fees and Sales	3,593.94	
		$9,109.94

Total Income	$609,616.75

Receipts from Tuition:

Students taking course of one year or more	956
Students paying tuition, non-resident in Rhode Island, at the rate of $150.00 per year	105
Amount of tuition paid	$10,781.25

EXPENDITURES

Expenditures, exclusive of Experiment Station and Extension Service:

Agricultural and Botanical Supplies	$1,280.13
Advertising in Publications	205.19
Equipment and Furniture	22,951.67
Forage and Veterinary Supplies	2,489.49
Freight and Express	1,371.54
Fuel	19,958.86
Interest on Federal Funds	7.44
Laboratory Supplies	17,455.32
Labor	63,129.84
Light, Heat and Power	8,319.57
Medical and Surgical Supplies	721.47
Motor Vehicle Expense	1,432.17
New Building (Athletic House)	3,634.78
New Land	2,500.00
New Sewer	2,594.37
New Well	500.00

Office Supplies	2,619.29	
Permanent Improvements	13,490.81	
Postage	1,879.02	
Printing	3,982.05	
Provisions	39,910.43	
Recreational	2,373.95	
Refunds	1,382.80	
Rental	2,323.31	
Repairs and Replacements	24,240.64	
Salaries	205,508.68	
Sanitary Supplies	3,620.23	
Special Services	1,538.82	
Subscriptions	1,128.92	
Telephone and Telegraph	1,767.18	
Transferred from Trust to Current Fund	4,479.52	
Traveling	3,041.44	
Books for Store	10,227.62	
Soda Fountain Supplies	1,902.24	
Miscellaneous	10,789.20	
		$484,757.99
Expenditures, Experiment Station		94,696.12
Expenditures, Extension Service		34,928.22
Expenditures, State Feeding, State Fertilizer and Egg Laying		7,852.90
Total Expenditures		$622,235.23

ANALYSIS OF BALANCE JULY 1

	1933	1934
Reserve	$4,000.00	$4,000.00
State Maintenance		
Special State Appropriation:		
New Sewer	2,594.37	
New Well	500.00	
Current Fund	7,447.20	1,089.10
Trust Fund	9,370.84	2,460.71
Morrill Fund of 1890		
Morrill Fund of 1862		
Smith-Lever Fund—Extension Service		
Capper-Ketcham Fund—Extension Service		
Additional Federal Co-op. Funds—Extension		
Hatch Fund—Experiment Station		
Adams Fund—Experiment Station		
Purnell Fund—Experiment Station		
Miscellaneous—Experiment Station	1,007.74 Dr.	892.91

State Feeding Stuffs		
State Fertilizer Control	40.90	2,293.59
Egg Laying Contest	811.73 Dr.	1,807.38 Dr.
	$22,133.84	$8,928.93

STUDENT ACTIVITIES ACCOUNT

		Dr.	Cr.
By Balance brought forward from last year			$4,463.03
Receipts during year:			
(a) Student Fees	$18,465.00		
(b) Season Tickets	462.00		
			18,927.00
To Band		$289.70	
Baseball		2,324.95	$531.81
Basketball		2,374.33	802.44
Beacon		670.00	
Books		14.30	2.20
Boxing		72.32	21.08
Debating		250.10	
Dramatics		350.00	
Football		7,758.55	5,424.32
Freshman Athletics		1,586.42	
Improvements		8,668.40	105.53
Intra-Mural		107.26	
League of Nations		99.80	5.00
Musical Clubs		1,474.77	1,197.07
Northfield Conference		16.00	
Phi Kappa Phi		75.00	
Rifle Team		131.10	17.90
Sachems		37.51	
Tax		1,454.60	405.02
Track		2,546.84	1,001.60
Wrestling		110.10	
Young Women's Athletic Association		1,058.41	209.84
Cash on hand August 31, 1934		1,643.38	
		$33,113.84	$33,113.84

ALUMNI STUDENT LOAN FUND

	Dr.	Cr.
By amount of contribution to July 1, 1933		$1,200.00
By amount of contribution received 1933-34		442.12
By amount of interest accrued to July 1, 1933		516.24

By amount of interest during 1933-34		89.82
To Loans out, July 1, 1934	$1,726.50	
Cash on hand	521.68	
	$2,248.18	$2,248.18

CAMPUS CLOCK FUND

By gifts from Senior Classes, 1908-1919	$226.41
By amount of interest accrued to July 1, 1933	292.96
By amount of interest received 1933-34	18.32
	$537.69

FREDERICK ROY MARTIN STUDENT LOAN FUND

By amount of fund received June, 1925	$150.00
By amount of interest accrued to July 1, 1933	43.04
	$193.04
To loans out	179.50
	$13.54

RHODE ISLAND STATE COLLEGE
REPORT OF THE AGRICULTURAL EXPERIMENT STATION

President Raymond G. Bressler,
Rhode Island State College,
Kingston, Rhode Island.

Sir:

Herewith I am submitting the annual report of the Agricultural Experiment Station for the year 1934, which is the forty-seventh report of the Station, as required by law.

This report of progress was prepared by Dr. B. E. Gilbert, Director of Research.

Respectfully submitted,

G. E. ADAMS,
Director, Experiment Station.

RHODE ISLAND STATE COLLEGE
REPORT OF THE AGRICULTURAL EXPERIMENT STATION

DEAN AND DIRECTOR GEORGE E. ADAMS,
Rhode Island State College.

DEAR SIR:

I have the honor to submit to you the Forty-seventh Annual Report[1] of the Rhode Island Agricultural Experiment Station.

During the past year the program of work and the efforts of the research staff have been focused as always upon attempts to solve the difficulties confronting American agriculture and the New England farmer. In accord with the national policy of coordinated effort in the solution of agricultural problems, station workers have cooperated in national programs whenever the opportunity arose.

Direct and tangible evidence of such cooperation may be found in the field of agricultural economics. Early in the year the services of the chief economist were loaned for work on problems of national scope under the Agricultural Adjustment Administration. Later, this economist and another, resigned from the Rhode Island station staff and accepted federal positions. A third worker served as Director of the Rhode Island portion of the national survey on "Farm mortgage and land values," the data of which are of importance in the local situation as well as nationally. Data have been secured and made available for use by various agricultural groups within the State. Of particular importance has been the information supplied in connection with the regulating of the producer and consumer prices of fluid milk.

The personnel changes which have taken place in the department of agricultural economics have necessitated a reorganization. The office of this department has been moved from Providence to Kingston and A. L. Walker, an economist of long experience, has been engaged. Along with such reorganization, the program of work in agricultural economics is being changed to more nearly meet the present situation. A further addition to the staff of the station has been that of W. R. Gordon who will undertake research work in the field of rural sociology.

---

[1] Contribution No. 467. In Bulletin of Rhode Island State College, Vol. XXX, February, 1935.

There have been but few adjustments in connection with the buildings and lands operated by the research staff. Early in the year four acres of land, at present largely used by the station for studies on golf and putting green grasses, were purchased jointly by the college and experiment station. During the past year a poultry house comprising four 20 feet by 20 feet pens was constructed at the East Farm in order to meet partially a definite need for increased housing capacity. This house is of an experimental type with an entirely open front and an opening above the roosts running the length of the house, this rear opening being closed in cold weather with sisal paper. The roofing problem was solved by the use of corrugated sheet metal and the entire house was designed with the view of finding a housing method that would give satisfactory results in egg production at a lower overhead cost than the conventional types now in use.

RESEARCH WORK

The more important lines of work to which members of the research staff have given attention during 1934 are discussed. Where possible, reports of progress and results of research are given. Many of the latter, however, can be regarded only as trends or impressions until established by further experimentation.

Agricultural Economics

Butterfat Price Differentials for Fluid Milk. A study of the relationship between the butterfat test of milk and the feed cost of producing such milk has been completed and a manuscript prepared for publication. This study is based on data obtained from records of members of the Dairy Herd Improvement Association in the State. Records of the feed consumed by, and records of the milk and butterfat production of 1,093 individual cows were used. Some of the conclusions from this study are:

a. There is a direct relationship between the butterfat test of milk and the quantity of feed required to produce 100 pounds of milk.

b. Beginning with the feed cost of milk testing 3.7 per cent butterfat as a base, each increase of one-tenth of one per cent in butterfat content caused the feed cost to increase 1.8 per cent of the base amount. Each decrease of one-tenth of one per cent in butterfat caused feed costs to decrease 1.8 per cent of the base amount.

c. A butterfat price differential equal to 1.8 per cent of the price paid for milk testing 3.7 per cent butterfat will adjust the price of high-test and low-test milk so that the returns will be in proportion to feed costs.

d. Every change in the base price for fluid milk must be accompanied by a change in the butterfat price differential, if the relationship between the two is to be maintained.

e. The butterfat price differential for Class I milk and for Class II milk should be calculated separately, because the prices of these two classes of milk are not the same.

Costs and Returns from Grading Vegetables. A study of the costs of and the returns from the grading of vegetables has been completed and a manuscript prepared for publication. Practical growers differed in their opinions regarding the profitableness of marketing vegetables in accordance with exacting and identifying grades. Some felt that the regular farm pack would bring greater net returns. This study was undertaken to obtain information on this point.

Daily comparisons were made during 1930 and 1931 between highly-graded lots and regular farm packs of vegetables. The comparisons were made for hot-house tomatoes, field tomatoes, bunched beets, bunched carrots, cucumbers, and peppers. Some of the conclusions from this study are:

a. The superior grading practiced in these experiments yielded a return above costs in some instances, but in general was not profitable.

b. The chances for a profit from rigid grading seemed less with low-priced products such as bunched beets and bunched carrots than with products such as tomatoes and peppers.

c. Profits from grading were related to the percentage of the crop which met the grade requirements. Crops with a large percentage of superior product tended to return a profit from rigid grading, while rigid grading of crops with a low percentage of superior product usually resulted in a loss.

d. The early harvests from some crops tended to be superior to the late ones. Thus, the necessary amount of grading and sorting varied as the harvest season advanced.

e. The premium paid for highly-graded produce as compared with farm-packed produce was greatest on the average when prices were relatively low. This would seem to indicate that grading paid best on a heavily-supplied market.

f. Observation led to the conclusion that rigid grading did not materially quicken the sale of produce. The better grades sometimes sold a little more readily but the seconds usually were slow to move.

g. The difficulties of rigid standardization are so great with perishable agricultural products as compared with most industrial products, that the additional costs appear to be relatively high. These additional costs must be returned to producers if they are to accept such standardization.

Dairy Herd Replacements. Work on a study of dairy herd replacements was continued. Information for individual cows from Dairy Herd Improvement Association records has been obtained regarding the production of milk and butterfat; the length of the lactation period, the feed consumed, the cost of the feed, and the value of the milk produced.

Information for each cow was obtained from the owners regarding the age; the breed; whether raised or purchased; if purchased, the source; whether grade or purebred; the length of time in the herd; the reason for disposal, if no longer in the herd; the purchase price, or if raised, the value when added to the herd; the price received, if sold; the value at the end of the year, if still in the herd; and other pertinent data. Some preliminary conclusions from this study are:

a. About two-thirds of the 1,100 cows included in this study were purchased and one-third were raised. The average age of the purchased cows was 6.3 years and the cows which were raised 4.8 years.

b. The purchased cows, on the average, consumed a little more feed, had a higher production of milk and of butterfat, and made a higher net return for milk above feed costs than did the cows that were raised.

c. An analysis of the reasons for disposing of cows indicates that the reason was low production in 22 per cent of the cases; reaction to the T.B. test in 19 per cent; udder trouble in 10 per cent and failure to breed in 8 per cent. Other reasons given for disposing of cows were a low butterfat, test, abortion, injury, and lack of constitution and vigor.

Real Estate Transfers and Tax Delinquency. In co-operation with the United States Bureau of Agricultural Economics and the Civil Works Administration, data were obtained on transfers of real estate involving properties of three acres and over and on tax delinquencies.

Real estate transfers were examined in sixteen towns. In over one-half of these towns the period covered was from about 1900 to 1933 and in the remaining towns from 1910 to 1933. For each transfer these data, insofar as they were available, were recorded: the buyer and seller; the location of the property; the acreage; whether or not there were buildings on the property; the assessed valuation at the time of transfer; the kind of sale; and the kind of deed. In this State the sale price seldom is given in the deed.

These records are now being summarized. The analysis points to two tentative conclusions:

a. Real estate transfers of acreage property were relatively greater during the years 1919 to 1930 than during the decade previous to 1919 or during the years since 1930.

b. Forced sales or liquidation of properties were a very small part of all transfers, and,

c. The properties transferred through tax sales were practically negligible.

Information on tax delinquencies was obtained, for the years 1928 to 1933, on individual properties of three acres or more in a few towns and on all property for most of the towns in the State. Data on the trend in taxes on farm land also were obtained. Some preliminary conclusions from the study of these records are:

a. In those towns where records of tax delinquency on individual farms were obtained there was some increase in uncollected taxes in 1932 and 1933 as compared with the years 1928 to 1931. There was, also, an increase in the amount of unpaid taxes due from former years.

b. Delinquencies in most of the towns in 1932 and 1933 showed an increase over delinquencies for the years 1928 to 1931.

c. There are wide differences between towns in the percentage of the taxes that are delinquent, particularly in the percentage of the taxes of former years that are uncollected. This situation is due in part to poor town business management and inefficient methods of collection as well as to differences in ability to pay.

d. There are some indications that delinquencies on personal property are relatively higher than on real estate and that delinquencies on acreage property used for residences, recreation, and business are relatively as great as delinquencies on farm land. It was not possible, however, to check this situation.

e. There has been very little change in farm taxes from 1931 to 1933. The trend is slightly downward.

Reducing the Feed Costs of Producing Milk. A study of ways to reduce the costs of feed for dairy cows was begun. The object is to assemble and interpret available data regarding the costs of pasture, forage, and feed for dairy cows that will be useful to dairy farmers in determining ways to reduce feed costs.

Farm management survey records on dairy farms have been examined and tabulations made of the acres of pasture, the acres of crop land and its use, the yields of forage crops, the production of milk and the purchases of feed. From these tabulations the management and use of the tillable land on these farms will be studied and some of the relationships between such management and the costs of feed determined.

Other sources from which information will be obtained are: Records of the cost of producing milk and records of the dairy herd improvement associations. The results from pasture improvement and the place and use of annual forage crops will be summarized. The relation of the application of fertilizer to yields of forage crops as shown by experiments will be discussed.

Agronomy and Horticulture

FIELD CROPS. *Fertilizer Requirements.* Irish Cobbler potatoes were grown on the plats receiving different levels of fertilizer. Nitrogen levels of 0, 56, and 112 pounds per acre gave yields of 82, 216, and 187 bushels per acre respectively. It will be noted that the optimum nitrogen level for potatoes was undoubtedly exceeded with the larger application. The yields were abnormally low this season due to the prevailing dry weather.

The use of extra potash resulted in an increase in yield from 217 bushels per acre when 112 pounds of potash were used to 263 bushels when 224 pounds were applied. It was also noted that the high potash plat had a much lower percentage of scab than was found on the low potash treatment. This may be, in part, a seasonal condition. With extra phosphorus there was found to be no significant difference in the yield.

With 1,400, 2,100, and 2,800 pounds of a standard fertilizer, 4-8-8, the yields were 186, 251, and 223 bushels per acre respectively. Again the dry weather made conditions unfavorable for the maximum use of the high fertilizer application.

Four plats on the limed side of the experiment where different phosphorus carriers are compared were devoted to a study of grasses in pure culture. The plat receiving no phosphorus produced the lowest yields. All phosphorus treated plats gave fair yields for a first year planting. The use of extra potash or extra nitrogen did not increase the yield. The remainder of the plats in this experiment were seeded to grass with a nurse crop of oats.

Green Mountain potatoes were grown on the plats used to test various carriers of potash. The largest yield was obtained with the 200 pound per acre application of potash in sulfate of potash. The use of additional nitrogen or phosphorus did not produce as large a yield as was obtained with the sulfate and normal nitrogen and phosphorus. The lowest yield when potash was applied at the rate of 100 pounds per acre was recorded on the kainit plat.

Some exceptionally large hay yields were produced during the past season. The early part of the season was very favorable for hay. On four plats seeded to a mixture of alfalfa, red clover, alsike clover, and timothy and fertilized with 900 pounds of a 2-8-10, an average yield of 4.5 tons of dry hay per acre was produced. This was the total of three cuttings. One of the rotation plats seeded to alfalfa and timothy in the third year of production yielded from three cuttings 5.37 tons per acre of dry hay.

Soil Acidity and Liming. Onions, mangels, and potatoes were grown on the plats where nitrate of soda and sulfate of ammonia are compared with and without lime. For the past few years this experiment was devoted to a study of various shrubs. It was thought that some effects of the previous shrubs might be reflected in the current crops. There were great differences in the yield between plats, but no differences were noted on individual plats which could be attributed to the previous years' growth of shrubs. The unlimed nitrate and sulfate plats produced very low yields of onions while the limed plats produced satisfactory yields. The same condition was noted for mangels. The limed sulfate plat gave the largest yield of potatoes.

Magnesium Deficiency in Soils. Co-operative tests and greenhouse work with potatoes were continued with various carriers of magnesium. Previous field results have shown that a great many potato fields would be greatly improved through the use of small amounts of magnesium. The greenhouse studies, on a high potash soil, indicate that a soil heavily fertilized with potash is more apt to suffer a magnesium deficiency.

Crop Effects on Succeeding Crops. Sixteen regular crops were grown on the plats used in this study. Certain improvements in cultural technic have resulted in considerably increased yields of onions in recent years. Onions were best after corn and the poorest after mangels. Mangels were again very poor after mangels. Millet produced most after mangels and the lowest after corn. Carrots yielded the most after corn and least after potatoes. Mangels, corn, buckwheat, and redtop were grown in the cement frames used in this study. There were considerable variations in yields.

Seed Sources and Varieties. Investigations into the value of various potato seedlings under local conditions were again carried on in co-operation with the U. S. Department of Agriculture.

Studies of the previous fertilization of the tubers did not reflect any consistent differences in the yield.

In the test of ensilage corn varieties, West Branch Sweepstakes produced the highest yield on a dry-weight basis with a yield of 4.20 tons per acre.

The yields of the different varieties in the test were as follows:

Variety	Tons per acre Green-weight basis	 Dry-weight basis
Eureka	18.36	3.91
Lancaster Sure Crop	17.59	3.75
West Branch Sweepstakes	17.07	4.20
Burr Leaming	16.35	3.76
Golden Nugget	15.57	3.44
Canada Leaming	15.65	4.09
Rhode Island Flint	13.55	3.47
Cornell 11	11.59	3.21

The most outstanding results in the soybean and lespedeza variety test were with the Cayuga soybean. This variety was developed at the N. Y. Agricultural Experiment Station and is noted for earliness and seed yielding quality. In our test it matured far ahead of any of the other varieties. Also, it produced the largest yield in tons of dry matter per acre. The perennial lespedeza Sericea 04,730 was found to be very winter hardy. Harbin 65,280 again was the only lespedeza to mature a crop of seed.

Plant Breeding and Selection. A number of crosses were made between selfed lines of alfalfa that had been inbred for several generations. In addition, first generation material from crosses made last year were grown. The severe winter eliminated many strains that had been carried along for breeding purposes. The breeding work is being carried on both in the field and greenhouse.

Several strains of eggplant obtained from crosses made at the station are being tested for disease resistance and general adaptability to Rhode Island conditions.

MARKET-GARDEN CROPS. *Fertilizer Requirements.* Reducing the nitrogen content of the fertilizer approximately one-half decreased the yields of all the market-garden crops excepting peppers and celery. In 1933 there was a small reduction in the celery crop due to the small application of nitrogen, while this year the yields dropped a very little on one rotation but not in a second. The largest decrease was in the yield of early cabbage which was reduced from 424 barrels per acre with the standard fertilizer to 317 barrels per acre with the reduced nitrogen. Early lettuce gave the smallest decrease with a drop of only 28 boxes producing a yield of 1,017 boxes per acre. The order of decrease from the largest to the smallest was early cabbage, early tomatoes, early or late spinach, late beets, early beets, cauliflower, late carrots, and early lettuce.

The yields of all of the above mentioned crops were reduced the past season where the phosphorus was omitted from the fertilizer excepting in the case of early beets and celery. Usually with the exception of lettuce and peppers, these crops do not respond markedly to variations in phosphorus application. This season the tomato yields dropped from 310 bushels of No. 1 to 209 bushels per acre when the phosphorus was omitted in the rotation where green manure and a very little stable manure are used.

Celery again leads the list of crops responding to potash. The decrease was from 1,117 dozen bunches per acre with the standard fertilizer to 772 bunches where potash was entirely omitted from the fertilizer. A partial reduction produced a much smaller decrease. The crop of late beets was smaller where potash was omitted as was the case with the crops mentioned last year; namely, early lettuce, tomatoes, or cabbage and late spinach.

The comparison between applying all nitrogen before planting and applying one-third before with two-thirds used as side-dressings was continued. Late spinach again responded with an increase where part of the nitrogen was put on as a side-dressing. The average yields were 702 and 820 bushels per acre respectively for the two methods. Early cabbage, which usually does not respond to side-dressings, showed some benefit this year. Early lettuce and celery which were benefited in 1933 by side-dressings did not show an increase in yield this year.

Each season some of the vegetable crops receive amounts of fertilizer in excess of the standard application which is about 1,500 pounds per acre. The extra amounts of fertilizer compared the past season were again the standard amount, 35 per cent and 75 per cent extra. Crops of early cabbage, lettuce, or tomatoes and late crops of beets, spinach, or celery were included in this test. All crops were increased from 4 to 40 per cent by the 35 per cent extra amount of fertilizer where a medium amount of manure was used. Where the amount of manure was small and it was used with green manure only, the yields of tomatoes, celery, and spinach were increased by the additional fertilizer. Early tomatoes and late beets responded to the 75 per cent extra while celery did in one rotation but not in the second.

Early spinach yields were reduced from 1,342 bushels per acre to 967 bushels by omitting manganese sulfate from the fertilizer. Early beets did not show manganese deficiency the past season.

Stable Manure vs. Green Manure. Where a complete fertilizer and 32 tons of manure were used, yields of early beets and spinach were larger by 150 dozen bunches and nearly 400 bushels per acre respectively over that obtained with a like fertilizer and 16 tons of stable manure.

Where applications of 24 and 16 tons per acre were compared on the six crops noted previously under the discussion of extra amounts of fertilizer, late celery was the only crop which failed to respond to the larger amount.

Where 20 tons of manure has been applied for a number of years in comparison to green manure and chemicals, yields of early spinach were 1,340 and 1,370 bushels per acre respectively. Following the spinach on these plats, cabbage yielded 388 and 347 barrels per acre respectively.

Strains and Varieties. World Beater again produced the largest crop in the comparison of pepper varieties. Waltham Beauty was second and California Wonder third, followed by King of the North and Early Giant.

Bestal was the earliest variety of tomato, followed closely by Clarke's Early, Pritchard, and Speed. Clarke's Early gave the largest total yield of No. 1 tomatoes per acre.

In the six strains of New York or Wonderful lettuce compared, the variations were relatively small. Strain number 5 from Ferry-Morse was the first in yield.

The test of early cabbage showed a wide variation among strains when the first two cuttings only were compared. These cuttings were made on June 13 and 22. The largest yield was 357 barrels from Harris' Golden Acre, while the smallest was 219 barrels. Viking, which produced the highest yield in 1933 for the two first cuttings, was third this year with a yield of 309 barrels per acre.

The King of Denmark spinach gave a slightly larger yield than Virginia Savoy, Reselected Bloomsdale, or Nobel Giant Leaved. The crop was cut on October 31.

Two strains each of Early Wonder and Crosby Egyptian beets were again compared. Woodruff's strain of Early Wonder slightly outyielded Harris' strain of Crosby Egyptian.

Only a trace of bacterial wilt was noticeable in the sweet corn test the past season. This is in sharp contrast to the previous season when the crop with some varieties was almost a complete failure due to the disease. Spanish Gold and Golden Early Market reached production peak on August 3. The ears of the latter were larger but not as numerous as the first mentioned. Whipple's Yellow and Golden Cross Bantam matured at practically the same time, August 14, but the latter had longer ears and was more prolific. Tendergold was included for the first time. It matured between the two dates previously mentioned. The ears averaged between 6 and 7 inches in length.

Bountiful continued to be the most prolific variety of bush beans tried.

A trial of five strains and varieties of fall celery showed variations in length and diameter of stalks as well as tendency to develop hollow stalks. No one strain combined all the good points.

GRASS AND TURF EXPERIMENTS. *Lawn Grasses.* The turf plats maintained at lawn length flourished unusually well except for a period of drought during July and early August. Plats of bent grasses fertilized with sulfate of ammonia have excelled those fertilized with nitrate of soda during much of the growing season. In former seasons the highly acid plats suffered injury in the spring from fertilizer applications which were not harmful on other plats. The trouble was largely overcome this season by watering as soon as the fertilizer was applied. More snowmold appeared in heavily fertilized turf on neutral or slightly acid soils and where nitrate rather than ammonia nitrogen was applied. Later in the season brownpatch appeared in a majority of the plats fertilized with nitrate of soda. Some turf was lost due to the combined injury from brownpatch and the drought.

Portions of the plats treated previously with arsenate of lead (9 pounds per 1,000 square feet) were practically free from earthworms, grubs, chickweed, and crabgrass.

Plats of Kentucky bluegrass seeded in 1929 had gradually become invaded with bent grasses until the bents predominated. They have been replanted and will be used for a comparison of ammonia, nitrate, and organic nitrogen carriers. Rather remarkable improvement in sparsely grassed and weedy turfs has resulted from an application of compost annually. This was especially pronounced on acid turf of Colonial bent and the mildly acid turf of creeping bent.

Plantings of red and fine-leaved fescue made in early July grew slowly until mid-September although watered and fertilized. It appears that these grasses thrive only during cool weather. A set of plats in the center of a campus play field are yielding valuable data as to the comparative resistance of grasses to wear.

Fine Turf Grasses. A number of experiments with a wide variety of grasses in fine turf as well as tests of Rhizoctonia disease and webworm control have been summarized in Bulletin 245 entitled, "Putting green grasses and their management," published during the year.

Some of the results of this study follow:

Rather wide variation was found among the velvet bents and only exceptional strains were rated higher than the best Colonial bents. Velvet bents were seriously injured by the bluegrass webworms.

Representatives of three more or less distinct types of Colonial (Rhode Island) bent were under test. Differences in the quality and susceptibility to brownpatch of the turf were found in the plats of the common type of Colonial bent.

The creeping bents have been rated lower in turf qualities than the Colonial bents.

Turf of velvet and creeping bents grown from seed was found to become similar in quality to that produced from stolons of the same strain. Likewise the turf of Colonial bent and seaside creeping bent from seed grown in Rhode Island one generation produced turf very similar to that of the parent grasses.

Bluegrass, fescues, redtop, and a few poor strains of creeping bents were found unadapted in this region for turf clipped as close as one-fourth inch.

The amount and control of Rhizoctonia disease is tabulated for each species of the bent grasses and general directions are suggested for the control of dollarspot, brownpatch, snowmold, and scald.

Tests have shown that a spray of 1 to 2 pounds of arsenate of lead in 10 to 20 gallons of water gave good control of the bluegrass webworm.

Equipment is described which is now in use for sterilizing compost with steam. This practice has been justified for the control of crabgrass and grass mixture.

A section which is devoted to a comparison of fertilizer ratios on three popular bent grasses is in its second season. Thus far the highest rate of nitrogen has produced the best turf. Deficiencies of phosphorus and potash have not yet become noticeable. Velvet bent (B. P. I. 14,276) has been found to require less nitrogen than the Colonial and the creeping bent in order to form turf of good quality. The incidence of dollarspot in creeping bents was independent of the treatments this season. Clover is becoming more abundant in the plats which receive low and medium amounts of nitrogen.

Bent Grass Seed Production. A first comparison of varieties of bent as to yield of seed has been completed. Yields of redtop, Colonial bents, velvet bents, and creeping bents, were secured during the four crop years. Yields of seed were higher each year in redtop than in the other grasses. Astoria yielded more than Rhode Island Colonial bent. One strain of velvet bent was equal to Rhode Island Colonial but the other three were considerably below. The trend of percentage yields during the period based on yields of redtop has been gradually downward in the Colonials, abruptly downward in the creeping bents, and gradually upward in the velvet bents. Stands of redtop, Colonial, and velvet bents have generally remained pure and persisted well, while stands of creeping bents were much less permanent. The area where this test was located will be used for a test of a large number of selections from superior strains of velvet and Colonial bents both for yield of seed and quality of turf.

A project to determine the fertilizer ratios best suited to seed production with Colonial bent has been completed. The experiment will be repeated after planting the same area to velvet bent. This study has been summarized in Contribution No. 461 of the station entitled, "Seed yields of Rhode Island Colonial bent (*Agrostis tenuis* Sibth) as influenced by the kind of fertilizer applied." Yields have been increased largely in proportion to the quantities of nitrogen applied. Applications of 1,500 pounds per acre per season of the 1-6-3 fertilizer and in later seasons of the 2-6-3 fertilizer produced lower yields than no fertilizer at all. The fertilizers such as 6-6-1 and 6-2-3 were slightly more effective than were those such as 6-6-5 and 6-10-3. Liming caused only a slight increase in yield, although the soil was highly acid. Yields from relatively large amounts of nitrogen were over three times as high as the yields from low levels.

SMALL AND DRUPE FRUITS. *Blackberry Breeding.* An effort was made during the past season to secure more selfed seed in order to study the genetic constitution of the plants used as parents in crossing. Plants of the varieties listed in last year's report were therefore potted for removal to the greenhouse and placed in soil in a sheltered location until greenhouse space became available late in January. The severe winter weather apparently affected the plants adversely as many failed to blossom and none were equal to plants used in previous seasons in vigor of growth or number of normal blossom clusters. Out of 45 clusters covered for selfing, only 27 produced fruit and the fruits in many cases were small or failed to mature properly. The effect of the winter was still more apparent on plants remaining in the field. Only one variety, the Eldorado, produced a measurable yield and even this variety set not over 10 or 15 per cent of a normal crop.

Whether due to the unusually low temperature during the winter, or some unknown cause, there was an unexpected increase in germination of seeds from the cross pollination work of 1933. Out of 108 pots planted in the fall of 1933 and placed in a cold frame through the winter, 84, or 78 per cent, produced one or more plants during the past summer. This compares with percentages of not over 40, or 50 per cent, germination, for different lots of seeds planted in previous years. The increase in germination of individual seeds from different lots was even greater, and exceeded the previous year records by more than 100 per cent.

In the fall of 1933 seeds of several varieties of blackberries were sent to the Boyce Thompson Institute of Yonkers, N. Y., for a special study of methods to increase the percentage of prompt germination. The results of several different treatments indicated that the best germination (61 per cent of the total number of seeds planted) was obtained when seeds were treated for two and one-half hours with concentrated sulfuric acid, then kept at 5° C. for a period of after ripening. After this they were germinated in a greenhouse under controlled temperatures varying from 10° C. at night to 20° C. in the daytime. This procedure is being followed as far as facilities permit.

Raspberry Fertilization. The plants in this experiment which is located on the East Farm showed very little freezing back due to the severe winter while plants of the same variety in nursery rows on the Plains exhibited considerable injury.

Growth of plants in the experiment started normally in the spring but yields from the field as a whole were reduced due largely to the protracted drought in July when the berries were maturing.

Comparative yields for 1933 and 1934 were as follows:

	Yields in kilograms			
	1933		*1934*	
Plat treatment	Total all plats	Average	Total all plats	Average
No potash applied	230.4	67.6	152.8	38.2
No phosphoric acid	343.7	85.9	300.1	75.0
No nitrogen	278.1	63.5	160.5	40.1
Complete fertilizer	382.0	95.5	298.0	74.5
Check plats (no fertilizer)	171.0	42.7	81.0	20.5
	1,405.2		992.4	

It will be noted from the above records that the total crop of 1934 was approximately one-third less than that of last year. The relative productiveness under the different treatments followed trends similar to those shown in previous years. It should be observed in comparing yields of the two years that plats to which both nitrogen and potash were applied but no phosphoric acid, suffered a reduction in yield of only about one-eighth the total yield of 1933, while check plats produced only about one-half of last year's yield.

The plats receiving only one of the chemicals—nitrogen or potash—together with phosphoric acid both suffered a reduction in yield of approximately one-third or about the same as the reduction in total yields of all plats. Results would appear to emphasize the importance of proper fertilization in minimizing losses due to unfavorable weather conditions.

Fertilization of Grapes. This experiment is located on the Plain and while the vines appeared to have suffered no freezing back from the severe winter, yields were so greatly reduced that no significant record of weights could be secured.

Drupe Fruit Plantation. Peaches, nectarines, and apricots suffered severely from the unusually low temperatures of last winter and no fruit was secured from any of the trees. Peaches and nectarines early showed more damage to the tops than did the apricots. Peaches and nectarines, however, are in most cases forming vigorous new tops while several trees among the apricots show greatly diminished vigor and may not make a satisfactory recovery. The full extent of the injury suffered by the trees in the severe winter of 1933-34 cannot be determined definitely until at least another season has elapsed.

Pruning, except for a few trees, was delayed in order to determine the extent of the winter injury. Foliation showed considerable difference in individual trees. Some started new growth towards the tips of the old branches showing relatively little killing back. Others sent out new shoots well towards the base of the tree. All are now showing a good growth and there is no appreciable difference in vigor of growth between early and late pruned trees except that the former got a little earlier start towards a new top and no new growth had to be removed. So far as this season's experience is an indication, early severe pruning, with the formation of a new top primarily in mind, would apparently have given the most satisfactory growth and form of top for the future management of the trees.

The plum orchard received four sprayings. Curculio and black knot were held effectively in check and brown rot did little damage up to the first of September. The crops of many of the late varieties, however, were seriously affected with brown rot, emphasizing the importance of finding an effective non-staining fungicide that can be used when the fruit is ripening and which will prevent development of brown rot on ripe fruit on the trees and on harvested fruit held temporarily in cold storage.

NUTRITION STUDIES. *Carbon Dioxide Assimilation of Fruit Leaves Under Different Treatments.* The assimilation of carbon dioxide has been used as a measure of the metabolic efficiency of apple, pear, and strawberry leaves. The influence of various spray materials and other factors has been studied both in the greenhouse and the orchard.

Apple leaves sprayed with lime sulfur solution assimilated less carbon dioxide than did unsprayed leaves. The reduction was secured regardless of time of application and weather conditions. Some variation in the amount of depressed assimilation suggests that the reduced activity may be limited by properly timing spray applications. Flotation sulfur and sulfur dust are apparently much less apt to cause lessened assimilation.

Strawberry and pear leaves subjected to a varying rate of air flow demonstrate the need of relatively large supplies of air if reasonable assimilation rates are to be secured. While the exact optimum rate has not been established, it is evidently over 1 liter per square centimeter hour.

Some preliminary results on the increase in assimilation with increasing natural light indicate an irregular assimilation curve and relatively high yields even at low light intensities. Average carbon dioxide assimilation of 6 to 10 mg. per 100 $cm.^2$ per hour for 12 consecutive hours was obtained with apple leaves. Occasional negative yields (respiration exceeding photosynthesis) were obtained.

Spray Materials. Leaves on vigorously growing Baldwin apple trees were thoroughly wetted by spray solutions by dipping.

Lime sulfur at high concentrations (1-8 and 1-15) may cause no more leaf burning than weaker concentrations under certain weather conditions. Lime sulfur 1-8 and 1-15 caused complete burning of leaves under some conditions. L. S. 1-40 caused less burning when applied at 8 A. M., 5 P. M., and 8 P. M., than applications at 11 A. M. and 2 P. M. L. S. 1-50, 1-67, and 1-100 caused progressively less burning.

Orchard Spray Tests. Preliminary results indicated that L. S. 1-40 and Flotation sulfur (paste) would satisfactorily control apple scab (*Venturia inequalis*) in 1934. Magnetic sulfur was fair in control but New Jersey Dry Mix was very inefficient when used throughout the season. Bordeaux 4-4-50 and 3-5-50 caused very severe russetting of fruit and partial defoliation of the trees. Flotation sulfur and lime sulfur caused some russetting of fruit, especially where the nozzle of the sprayer was apt to be close to the tree. About 300 to 350 pounds pressure were used in spraying. Results indicate enough variation in pest control on different sides of the tree to make sampling from all sides desirable. Analysis for lead residue from the arsenate of lead applied with different fungicides showed residues on Rhode Island Greening in all cases very close to the legal tolerances although all spraying stopped the first part of July. The residue on six random samples of McIntosh was very much less than the tolerance.

Chemistry, Plant Physiology, and Pathology

CHEMISTRY. *Measurements of Nitrate Nitrogen as Indices of Current Nitrogen Supplies.* Beets, celery, and carrots have been studied during the years. Previous work has shown nitrate nitrogen to be the principal storage form of nitrogen in vegetable crops and the usual available nitrogen in the soil. Soil nitrate accumulations are correrelated with those in the plant, and measurements of nitrates in either medium serve as an index to the current supply, with certain qualifications. The chief difficulty in determining optimum levels in the plant for various crops is the rapid fluctuation in the concentrations, caused by the changing rates of metabolism from variations in sunlight, heat, and other environmental factors. Thus, small concentrations may represent either real starvation conditions or a temporary shortage arising from an abnormal rate of use by the plant. It is also probable that different seasons and climates may require different indices.

To study the effect of day length on these fluctuations, beets were grown in sand in a greenhouse during March, April, and May, with continuous renewal of solution cultures. Three levels of nitrates were supplied; also natural daylight for 10 hours compared with natural daylight plus artificial light to make 16-hour days. Leaf samples, taken at intervals of about 2 weeks were divided into stems-with-midrib, and the remainder of the leaf. Nitrate nitrogen, total sugars, and reducing sugars were determined in the expressed juice on the supposition that low nitrate with high sugar content might result from the more extreme starvation under low nitrate, long-day conditions, and remain unaffected by normal environmental changes. This combination of results compared with those from higher nitrate levels under similar conditions might afford more reliable indices to true nitrogen starvation than nitrate determinations alone. The effect of day length on indices could also be observed.

Twenty-five plants from each bed taken at intervals of three weeks during April and May show the following ratios for weight of roots for low, medium, and high nitrates, respectively:

	10-hour day		16-hour day
April 9	15:45:51	:	58:101:100
April 30	25:56:49	:	53: 90:100
May 23	35:61:74	:	49: 81:100

Nitrates were consistently lower under long-day conditions than for the short day. Previous conclusions that 500 p. p. m. of nitrate nitrogen in juice from the midrib-petiole, and 50 p. p. m. in that from the remainder of the leaf are minimum levels for long-day conditions were corroborated. High levels proved of unexpected benefit for the 10-hour day. Apparently minimum values corresponding to the above are 1500 p. p. m., and 300 p. p. m. for short days.

Reducing sugars were somewhat higher in juice from the leaf blade without midrib for the long-day plants than for short days. Fluctuations caused by variation in daylight and temperature were much greater than any differences caused by different rates of nitrogen supply. Total sugars by invertase were little greater than the reducing sugars, either in juice from leaf blades or petiole-midrib, and showed no better correlation. Neither sugar fraction from petiole-midrib juice was correlated with nitrate supply or final yield. The concentrations of reducing sugars were greater in this conducting tissue than in juice from the leaf blade.

Celery was grown in the field during mid-summer in 18 frames, 0.001 acre in area. The fertilization, other than nitrate levels, was the same as used in a similar experiment reported in 1934. Nitrate levels designated as low, 10 p. p. m.; medium, 25 p. p. m.; and high, 50 p. p. m. were maintained in various combinations for three different portions of the growth period by analysis twice a week, followed by replacement of nitrates from analyzed solutions. Despite irrigation, the crop suffered from drought and finally developed a soft rot that destroyed its marketability. The harvest weights substantiated previous results, showing 10 p. p. m. of nitrate nitrogen to be optimum in the soil under these conditions, during the first third of the growth period, and that this concentration should be increased from 25 to 50 p. p. m. for the remainder of the season.

Juice analyses are also in agreement with previous results, showing 100 p. p. m. of nitrate nitrogen to be suboptimum in celery leaflets, mid-veins removed. The corresponding value for the petiole-midrib juice was 400 p. p. m. Optimum values are more uncertain, but it appears that 200 p. p. m. of nitrate nitrogen during the first third of the growth period and 300 to 400 p. p. m. during the remainder is sufficient for the leaf blades. Corresponding values for the petiole-midrib juice were 400 and 600 p. p. m.

Substitution of urea for nitrate of soda during the first third of the growth period did not reduce the salt concentration of the soil solution sufficiently to benefit the crop, possibly because of very rapid nitrification.

The quantities of sugars in juice from leaf and petiole changed from week to week with variations in weather, but were not correlated with growth or nitrogen fertilization. The results obtained thus far do not promise any aid from sugar determinations in the interpretation of nitrate concentrations.

Optimum Levels of Soil Nitrates at Different Periods in the Growth of Carrots. Following the procedure formerly used for beets and celery, Danvers' Half-Long carrots were grown during mid-summer in sunken cylinders containing 8 inches of soil above a deep layer of sand. The soils were fertilized uniformly with superphosphate and muriate of potash and with 19 different combinations of low (10 p. p. m.), medium (25 p. p. m.), and high (50 p. p. m.) of nitrate nitrogen during three portions of the growing season. Thus a L M H treatment signifies 10 p. p. m. of nitrate nitrogen for the first one-third of the growth period, 25 for the second, and 50 for the third. The soils are analyzed twice each week and deficiencies replaced from solutions of nitrate of soda. The growth was so slow during the first period that nitrification of soil nitrogen caused accumulation of nitrates above the low level desired. For the same reason the transition from high to low levels was slow between the first and second growth periods.

Considering the concentrations actually provided as shown by the analyses, and the quantities of nitrogen used, the M H M or M L M treatments proved desirable. A low concentration during the final period usually decreased the yield of roots, and a high level during that period increased the use of nitrogen without material benefit to the crop. The M L L treatment was definitely suboptimum.

The Effect of Crops on Soil Acidity. Beets, carrots, clover, onions, and timothy were grown in pots. One series was supplied with fertilizer made up from the customary fertilizer salts; the other received an equivalent amount of nitrogen, phosphorus, and potassium in purified ammonium phosphate and postassium carbonate. The beets were restricted in growth by insufficient nitrogen, and onions by the short days at the end of the season. After four months, the pH of the soil for the triplicate treatments was significantly more acid for clover and carrots in the first series, and beets and clover in the second series, than for timothy and onions. The latter group of crops increased the basicity of the soils slightly. The extremes in the first series were pH 5.99 to 6.53; in the second series pH 5.96 to 6.33. The pH of 10 fallow pots unfertilized, approximated pH 6.24 at the end of the growth period. These results corroborate those from a field experiment and furnish added evidence that this may be an important factor in the effect of crops on those that follow.

PLANT PHYSIOLOGY. *Available Soil Manganese.* Bulletin 246 entitled, "Normal crops and the supply of available soil manganese" was prepared and published during the year. This bulletin summarizes the results of experiments on the deficiency of available soil manganese which has been found to be operative under certain conditions in the soils of Rhode Island as well as in certain other states. The symptoms of this deficiency were described. The causes of the manganese chlorosis were definitely linked with soil alkalinity but not with soil type. Climatic factors and particularly temperature may be contributory causes. The deficiency disease can be corrected by application of manganous sulfate to the soil or plant and it may be prevented by maintaining a suitable soil acidity.

Toxic Aluminum vs. Weed Growth. The solution culture work on the investigation of the causes of the inhibitory effects on growth of weeds by the increase of soil acidity was completed and a paper entitled "Tolerance of certain weeds and grasses to toxic aluminum" was prepared. In brief, experimental evidence is given to show that the various weed species commonly found in competition with lawn grasses vary greatly in their sensitivity to aluminum in solution culture. From these facts it is suggested that the toxic aluminum in the soil solution may be one of the causes of the inhibition of weed growth on acid soils.

Forcing of Rhododendrons. Experiments to determine methods to hasten the growth of rhododendrons from the seedling stage have shown that given the proper conditions of moisture, temperature, and plant food the rhododendron plant can be made to grow rapidly and normally.

Seedlings were grown in drip sand cultures where the nutrient supply was maintained at constant levels. A range of pH from 3.5 to 8 of the nutrient solution made no difference in plant growth. Adding all of the nitrogen in the form of ammonium sulfate made no difference in growth when compared with the amount ordinarily used in a regular nutrient solution.

In a sand and decayed oak leaf mixture to which the nutrient solution was added six times per week the average gain in growth, as compared with plants growing in sand, soil, and oak leaf mold, and receiving no nutrient solution, was 7.5 inches during an eight months' period.

The forced plants were planted on the experiment station plain without shelter and among the adjoining trees. The unusually severe winter of 1933-34 seemed to provide an excellent opportunity to test the effect of greenhouse forcing on winter hardiness. The plants growing in the open without shelter showed less winter injury than those under shelter. There seems to be no connection between rapid growth during the winter months under glass and winter hardiness after transplanting.

Intercrop Effects. Further work has been carried on in connection with the effect of one crop upon the succeeding crop. Certain of the soils from areas where such studies are being made were leached and the leachings used as media in which to grow Cos lettuce seedlings. The results of several seasons of this work have shown that the toxic principle which appears in the leachings is not at all constant. Some seasons after certain crops it is found but on other occasions it will not appear. Various treatments have been used in an effort to determine the nature of this growth reducing principle. Recent work seems to indicate that the substance is inorganic in nature and to some extent colloidal. It may possibly prove to be toxic aluminum.

Other Projects. Considerable work has been done on projects concerning which reports have been made in former years. These experiments are all practically completed.

Chemical analyses are being made of crops grown in previous years in connection with Adams Project No. 4 entitled, "The physiological nutrient balance for grasses."

Another season's results are available on "The study of availability of phosphoric acid by means of the growth of certain crops and the chemical determination of the P_2O_5 removed." (Purnell No. 17). During the past summer, crops of barley and millet were grown in pots using several unusual phosphatic carriers. Chemical analyses are now being made of the crops grown in this experiment.

Additional data have been collected during the winter months of 1933-34 on "A study of the winter production of gladiolus." This will serve to further determine to what extent it is feasible for florists to use artificial illumination in the flowering of gladiolus for winter trade. This project was discontinued July 1, 1934.

The final crops of winter and spring tomatoes were grown and yield data secured. This project entitled, "A study of the factors affecting the growth and yield of winter tomatoes" was also discontinued July 1, 1934. The data is now being tabulated for publication.

PLANT PATHOLOGY. *Tests of Seed Treatment.* Tests were conducted for the second year with eight different commercial compounds used as seed disinfectants to control damping off on tomatoes, peppers, cabbage, lettuce, beets, cucumbers, and spinach. Trioxo gave the best control with cabbage. The organic mercuries caused some stunting when applied to lettuce seed. Trioxo and Formo-dust showed excellent results with tomatoes. Excellent results were obtained with P-D-7 and red oxide of copper on spinach. Red oxide of copper gave excellent results on cucumbers. Trioxo and Formo-dust were the best treatments for beets. They also gave good control with peppers.

Tests conducted in the field on spring and fall spinach showed very clearly the value of seed treatment. Spinach seed treated with red oxide of copper increased the yield 570 bushels per acre on spring spinach and 596 bushels on fall spinach over the check or untreated seed. P-D-7 increased the yield 245 bushels on spring spinach and 518 bushels on fall spinach.

SPRAYING. *Spray Tests with Tomatoes in the Field.* All tomato plants received one application of 2-2-50 Bordeaux mixture in the cold frame before setting in the field. Applications were then made every two weeks throughout the growing season. The concentration was increased to 4-4-50 after August first. These applications controlled early blight 90 per cent and late blight 95 per cent. No injury was apparent.

Staked vs. Unstaked Tomatoes. One third of the plants were sprayed three times in the cold frames with a 2-2-50 Bordeaux mixture, one third received three applications of copper lime dust 10-90, and one third of the plants were used as checks. These plants were divided when transplanted to the field, one half were staked and the other half were not staked. The center row in each plat was used as a check. One half of the staked and one half of the unstaked plants were sprayed every week and the other half every two weeks. The same procedure was followed with the copper lime dust. After August first the concentrations of the material was changed to 4-4-50 and to 20-80.

Spraying with Bordeaux every week caused stunting and the quality of the fruit was poor. Spraying every two weeks resulted in less injury and the quality of the fruit was better. The control of early blight and late blight was nearly 100 per cent.

The dusting part of the experiment showed no apparent injury on either the one- or two-week application. The quality of the fruit was better, but the disease was not controlled. The plants were killed by early blight long before the end of the growing season. Hence late blight caused no damage.

Celery. A careful disease control program was carried out on all celery grown in 1934. The celery plants were sprayed with a 4-4-50 Bordeaux mixture beginning when the plants were one inch high. They received four such applications before setting in the field. After the plants were well established in the field the regular spray schedule was started. These plants then received an application of 4-4-50

Bordeaux mixture every week thereafter during the growing season. Disease control on these plants was nearly 100 per cent. Only a few scattered plants showed even a trace of early or late blight.

Turf Disease Control. A comparison of commercial compounds used for the control of brownpatch and dollarspot on bent grasses showed that Calo-clor—a commercial preparation of one-third mercuric chloride and two-thirds calomel—gave excellent control.

Pink patch (*Corticium fusiforme*) was found in abundance in Rhode Island during the season of 1934. This disease was found to be causing damage on seven golf courses. The injury was apparent on both greens and fairways. From the few experiments conducted, it appears that mercury will control this disease. Calo-clor seemed to be the most promising of the materials used for control.

Home Economics

The Methods by Which the Housekeeping Activities are Carried on in the Home of the Married Woman Who Works Full Time Outside of the Home. This project has been developed as an outgrowth of the study of the amounts and kinds of paid work being carried on by homemakers in one Rhode Island county. The data in the previous study concerned chiefly the paid work and the conditions affecting or caused by it. In this project the way by which the homemaker working full time away from home for pay accomplished the homemaking duties is the chief consideration. So as to secure similar conditions in regard to home demands, only married women with husbands are asked to be cooperators. These women keep daily records of their activities with the time spent on each for a week at two different seasons of the year.

Another record is also kept by each woman showing the amount of time spent by either paid or voluntary helpers in various household tasks. In addition to this a detailed questionnaire is filled out concerning the dependence of each woman upon outside services such as ready-made garments, commercial laundering, or canning, and bakery or other cooked food products. Records will be secured from women living in villages or rural sections and an equal number of urban women. The comparison of the data from county and city is expected to be of particular value. To insure the greatest possible accuracy, visits are made to the women during the time when the records are being kept as well as before and afterwards. Facts about time and labor saving equipment and whether its purchase was made necessary by the woman's income-earning work, or made possible by the money so earned, are also secured.

The Use of Milk, Fruit, and Vegetables in the Diet of Rural Rhode Island School Children. In several sections of the state, mothers have kept detailed records of the food habits of 175 school children. They have recorded for one week the measured amounts of milk, fruit, and vegetables used by one child of school age. These amounts have been converted into the number of calories and grams of minerals supplied daily through these foods. An analysis of the results shows that on the average the standard requirements as suggested by Sherman and Rose are being met only partially. There is a wide range of differences among individuals, some falling far short of meeting the desired consumption of the protective foods. Two thirds of the group show a very good food selection, while one third shows a very poor selection. As the total family income does not seem to affect the selection, even in the very low income group, it would seem that the need for more education in food selection by both mother and child is indicated.

Poultry Husbandry

The Effect of Certain Calcium Intake Levels on Hatchability and Egg Shell Formation. This project, conducted over a 30-week period, entailed a wider range of calcium intake levels than was the case a year earlier; namely, a grain and mash ration in which the mash contained 1, 5, and 8 per cent of calcium carbonate respectively with a check pen fed the regular New England College Conference ration plus access to oyster shells.

The shell breaking strength of eggs showed a range consistent with the levels of calcium carbonate fed in the case of the 1, 5, and 8 per cent groups but was highest in the pen fed the regular ration plus oyster shells. Average breaking strength for the entire period of tests conducted weekly was 7.09, 8.40, 8.41, and 9.19 pounds respectively.

The hatchability of fertile eggs set in the same order of pens was 43.22, 67.50, 67.53, and 73.20 per cent. The levels of 5 per cent and 8 per cent in both the breaking strength tests and the hatchability records would seemingly indicate that very little additional value is secured through the feeding of the additional amount in excess of the 5 per cent level. On the other hand, the regular ration, which contained approximately 2.3 per cent calcium carbonate and in which the birds had access to oyster shells, would seem to indicate that the form in which calcium carbonate is administered; namely, finely-ground or in coarse granular form, may be of significance.

Egg production in the four groups was 60, 91, 93, and 98 eggs per bird respectively. The efficiency of the utilization of feed intake as related to the production of eggs may be expressed as the number of pounds of feed consumed necessary to produce one dozen eggs in the respective groups. The pen receiving 1 per cent calcium carbonate in the mash required 11.19 pounds of feed to produce a dozen eggs. The next two groups, namely 5 per cent and 8 per cent levels, were very close in efficiency, 8.30 and 8.54 pounds of feed being necessary to produce a dozen eggs. Here again it is evident that no additional advantage is gained by feeding an excess of 5 per cent of calcium carbonate in the mash formula. The greatest efficiency in the conversion of food materials into eggs was shown by the pen receiving the New England College Conference ration with access to oyster shells, the factor in this case being 7.96 pounds.

Average body weight per bird in the respective groups showed the same orderly direction as expressed by the other factors, with the birds weighing in the low calcium level group 5.96 pounds, in the 5 per cent group 6.21 pounds, in the 8 per cent group 6.21 pounds, and in the regular ration group 6.26 pounds.

Information is now being obtained from the data available relative to the effect of greater production to the shell strength of eggs. In addition, chemical analyses are being conducted to ascertain the actual levels of calcium in the mash of the respective groups as well as in the fecal material. From the feed consumption figures; the relative amount ingested; the amount lost in the fecal material; and the relative amount actually assimilated may throw further light on the question of whether the form of calcium carbonate is a major factor for consideration.

Infectious Rhinitis (*Coryza*). These studies, as was previously reported, have resulted in the isolation of gram negative baccili, pure cultures of which have been capable of reproducing the typical disease condition. Studies have been continued to determine whether any blood free media could supply the necessary requirements for growth.

The use of sterile raw potato in broth had failed to support any growth that could be detected by microscopic examination. Later efforts using the same media at the base of nutrient agar slants supported growth which could be determined microscopically. Other solutions may be substituted for the broth such as sterile water, peptone water, and sodium citrate solution. Growth may also be obtained in the same manner by using pieces of potato which are sterilized in the autoclave. The cultures were further checked for growth by inoculation of a suitable media.

Experiments to determine the value of culture vaccines in the immunization of chickens against respiratory infection have not proven encouraging.

The study of a turkey coryza has been of interest since a gram negative bacillus which resembles the chicken bacillus (*H. gallinarum*) in some respects was isolated. The turkey organisms have thus far been found to grow best on a blood medium but differ from *H. gallinarum* in that growth is obtained on nutrient and infusion agar. Pure cultures of these bacilli were found capable of inducing a coryza in young turkeys. Chickens have been more resistant to intranasal infection with pure cultures of the organism and also the nasal exudate of diseased turkeys. Guinea fowl which remain resistant to intranasal inoculations with nasal exudate of chickens infected with *H. gallinarum* were found susceptible to intranasal inoculations of pure cultures of the turkey organisms.

Further comparative studies of this organism are in progress.

Coccidiosis. The study of the persistency of viable oocysts in soils has been continued to check some of the results of the previous year.

The following drugs and chemicals were used to determine their value in coccidiosis infections and were found to be of little or no value; yatren, plasmochin, strabine, and acetic acid.

Land Utilization

During the past year the Purnell project on the present and future uses of Rhode Island land areas in which several station departments are concerned, has been continued.

The Bureau of Chemistry and Soils, U. S. Department of Agriculture, with the aid of the department of agronomy has completed the soil survey of Kent County and the data is now being compiled and soil maps are being made. Further data have been secured on the cover at present existing on the lands of Washington County.

A new development in this study has been a survey of recreational holdings with a view to determining the assessed value and acreage of the lands of Southern Rhode Island at present being used for recreational purposes.

These different types of data collected from all of these sources and when integrated should be of value in indicating economical land use trends.

OTHER ACTIVITIES

Feed and Fertilizer Control Services

Feed Inspection. The results of this branch of the regulatory service are published in the Annual Feed Circular dated May, 1934. During the year 304 samples of commercial feeds were examined. This number is the largest in the history of the inspection service and comprises 585 guaranties, 94 per cent of which were met. It is believed that the reported results are fully representative of the quality of feeds sold in the State.

Fertilizer Inspection. A slightly smaller number of brands of fertilizer and fertilizer chemicals were collected this year than in 1933. The results of this inspection are reported in the Annual Fertilizer

Circular dated September, 1934. The decrease in the number of brands is probably due to the operation of the fertilizer code, however, under the code there are still manufactured a sufficient number of brands to meet all requirements. A multiplicity of brands, many of which had but limited sale, have always been a source of expense to the fertilizer manufacturer and consumer. This year 93 per cent of the guaranties were fully met, and there was a slight increase in the number of brands containing more than 20 per cent of plant food. As was noted last year the 4-8-4, 4-8-7, and 5-8-7 brands apparently continue to be the most widely used.

Egg-Laying Contest

The Fourth Rhode Island State Egg-Laying Contest closed with an average production of 203.99 eggs representing a total of 210.04 points for the 51 weeks in the Contest period. The Contest finished in seventh position among standard contests in the United States and had the following placing with respect to individual pens in the respective breed classification: twelfth in S. C. White Leghorns, second in Rhode Island Reds, fifth in Barred Plymouth Rocks, third in New Hampshire Reds, and fourth in White Plymouth Rocks.

A new high record for the Contest was established by a pen of Rhode Island Reds which tallied 2880.80 points or at the rate of 288 plus points per bird. The leading individual bird at the Rhode Island Contest was the sixth highest bird in the entire country.

It is also of interest to note that the Rhode Island Contest attained the highest average egg size in standard contests in the country.

The management of the Contest is conducting several research problems at the present time on data obtained during the past few years with regard to the following: first, the relationship of state of production October first to annual production and adult mortality; second, the incidence of production of watery white eggs and the identification of offending individuals to ascertain strain characteristics and relationship of the production of such eggs to the physical condition of the bird and the state of production; third, the relationship between pullorum disease infection and annual egg production; and, fourth, a statistical study of all records since the Contest was first organized in order to throw possible light on the interrelationships of many factors.

Weather

The prevailing low temperatures during the winter of 1933 and 1934 made it a rather unusual winter. On December 16 and February 17 readings of –16° and –22° respectively were recorded. These readings are far below those obtained for a number of previous years. The only temperature approaching these readings during the past 25 years was on December 30, 1916, when a temperature of –16° was reported. The harmful effect of the low temperatures was very apparent on fruit trees and shrubbery. A great deal of peach trees were killed. Also, the stand of alfalfa on many of the experimental plats showed considerable winter damage or injury.

The months of April and May were wet and cold and plantings were delayed to some extent. The last frost was recorded on May 13 with a temperature of 31° [2]. All spring plantings were slow in starting because of the low temperatures.

General dry and warm weather prevailed throughout the months of July and August and was quite significantly reflected in crop yields.

Early potatoes matured earlier than normal. At harvest time it was possible, on a number of plats, to see the fertilizer still in the soil. Shallow rooted crops were most seriously affected. Hay crops did not show any harmful result either in appearance or in crop yield.

Fall seedlings were delayed for some time because of the lack of soil moisture. However, the delay did not prove harmful since in the latter part of August there was sufficient rain to make the growth of fall seedlings rapid.

While the temperature was abnormally high there did not seem to be as much harm from fungus diseases as in previous years. Perhaps this is accounted for in part by the clear weather and lower humidity when compared with similar periods in other years.

The month of October was fair with sufficient rain to relieve some of the mid-season deficiency. Frost occurred on October 3. The following table shows the departure from normal rainfall for the growing season.

---

[2] Climatological Data, New England Section of the U. S. Dept. of Agriculture Weather Bureau.

Month	Normal	1934	Departure
	Inches	*Inches*	*Inches*
April	4.71	5.92	+1.21
May	4.17	4.24	+ .07
June	3.33	3.19	— .14
July	3.47	1.38	—2.09
August	4.31	1.62	—2.69
September	3.50	3.23	— .27
October	4.18	3.20	— .98

Publications

Report on high analysis fertilizers. Jour. Assoc. Off. Agr. Chem. 17: 251-255.

Response of early cabbage to manures and fertilizers. Jour. Amer. Hort. Science 30: 470-474.

Preliminary studies in the fertilization of red raspberries. Jour. Amer. Hort. Science 30: 275-277.

Forty-sixth annual report of the Director. Bul. of Rhode Island State College 29: 53-100.

The cost of producing milk in Rhode Island. R. I. Agr. Expt. Sta. Bul. 241, 16 p.

Optimum soil-nitrate levels for table beets: Their effect on certain nitrogen-fractions in juice expressed from the leaves. R. I. Agr. Expt. Sta. Bul. 242, 27 p.

The influence of crop plants on those which follow. IV. R. I. Agr. Expt. Sta. Bul. 243, 33 p.

A magnesium deficiency induced by previous fertilizer treatments. Jour. Amer. Soc. Agron. 26: 609-615.

The response of potatoes to magnesium under various soil conditions. Amer. Potato Journal 11: 35-40.

Inspection of feeds. Annual Feed Circular, May, 1934. 20 p.

A hemophilic bacillus as the cause of an infectious rhinitis. R. I. Agr. Expt. Sta. Bul. 244, 12 p.

Putting green grasses and their management. R. I. Agr. Expt. Sta. Bul. 245, 44 p.

Normal crops and the supply of available soil manganese. R. I. Agr. Expt. Sta. Bul. 246, 15 p.

Seed yields of Rhode Island Colonial bent (*Agrostis tenuis,* Sibth) as influenced by the kind of fertilizer applied. Jour. Amer. Soc. Agron. 26: 939-945.

Inspection of fertilizers. Annual Fertilizer Circular, September, 1934, 17 p.

Survival of avian coccidia in soil. Poultry Science (In Press).

Respectfully submitted,

BASIL E. GILBERT,
Director of Research.

Kingston, R. I.
January 1, 1935.

RHODE ISLAND STATE COLLEGE
REPORT OF
THE EXTENSION SERVICE
1934

PRESIDENT RAYMOND G. BRESSLER,
Rhode Island State College,
Kingston, Rhode Island.

SIR:

I am submitting herewith the annual report of the Rhode Island State College Extension Service for the year 1934 as by law required. As in the past, this work has been carried on in cooperation with the United States Department of Agriculture and the three Rhode Island Farm Bureaus. This is the thirty-third report of agricultural extension work in Rhode Island.

At the commencement of the year covered by this report, the agricultural situation in Rhode Island was probably more serious from an economic standpoint than in many years. The continued lack of employment of our industrial population had materially reduced the local markets for agricultural produce and had, in addition, necessitated in many cases the extending of credit to purchasers far beyond the ability of many farmers to grant credit. Prices of all feeds were increasing with a steady lowering of the prices received for dairy and poultry products. The severe cold weather in the early winter had caused the death of many peach trees and serious damage to many of the apple orchards. At the end of the winter, the owners of peach orchards found themselves either with completely killed orchards or orchards that would not provide any income during the current year. In the case of the apple orchards, the Baldwins suffered serious injury, with other varieties being less seriously affected.

With the formation early in January of the Providence Production Credit Corporation, and the placing in operation of the Federal milk license early in April, financial conditions showed some signs of improvement. At the end of the year our farmers are probably in a better position than at its beginning.

Administration.

At the August, 1933, meeting of the Board of Managers of the College, the plan was approved for the reorganization of the agricultural and home economics work of the institution. This plan called for the merging of all agricultural and home economics interests under one Dean and Director with two Vice-Deans, one in charge of research and the other in charge of home economics work. The new school was designated as the School of Agriculture and Home Economics. On September 1st the Director of Extension became Dean of the School and Director of the Experiment Station, in addition to the duties previously carried.

Cooperation.

As in previous years, the National Recreation Association has been of great assistance in helping develop our recreational work with local rural organizations. With their cooperation four recreational institutes have been held, two in June, for young people, under the direction of John Bradford and two in October, in charge of J. Stuart Knapp. At the latter institutes, representatives of all groups were present. These institutes have been of great assistance in opening up new fields of activity for our rural folks. It is hoped that this work may be continued and developed in future years.

Members of the extension staff have delivered 339 radio addresses during the year. Daily broadcasts, except Sundays, have been given regularly as in the past two years, over Station WJAR owned by the Outlet Company in Providence. These talks are given under the headings of "Farm Chats" and "Housekeepers' Chats." Weekly talks have also been given over Station WEAN operated by the Shepard Company on the agricultural situation.

Our work has been greatly strengthened by the continued cooperation of the Providence Market Gardeners' Association, Grange, Parent-Teachers' Associations, local school committees, Farm Credit Administration officials, and the Narragansett Electric Company through its

Rural Electrification Engineer, and many other organizations and individuals too numerous to mention.

Sources of Revenue.

The financial report for the year ending June, 1934, as made to the United States Department of Agriculture, showed the income from various sources which was used for extension work to be:

Federal Capper-Ketcham Funds	$20,481.83
Federal Smith-Lever Funds	14,432.82
State Smith-Lever Offset	1,680.00
United States Department of Agriculture Funds allotted to Rhode Island and paid directly from the Federal Treasury:	
County Agent Work	$1,606.00
Home Demonstration Work	2,022.00
Boys' and Girls' Club Work	2,022.00
	$5,650.00

This allotment was $1,000 less than for the preceding year. The three local farm bureaus, as in years past, received from the State an appropriation of $6,500. In order to obtain this fund from the State Treasury it was necessary that an equal amount be appropriated by the towns or raised through donations or other sources of income. According to the State law the Northern Rhode Island Farm Bureau receives $2,500 and the Southern and Eastern Rhode Island Farm Bureaus each receive $2,000.

Personnel.

L. A. Keegan, Agronomist, on February 1, 1934, was granted indefinite leave of absence on account of illness. R. B. Corbett, Agricultural Economist, on December 1st was granted three months' leave of absence to work with the Agricultural Adjustment Administration. This leave was extended from March 1st to June 30th for service with the Federal Extension Service, Washington, D. C. Dr. Corbett resigned effective June 30th to accept a position as Senior Agricultural Economist of the Extension Service, United States Department of Agriculture. John L. Tennant was made Associate Agricultural Economist on April 1st.

Publications.

During the year two bulletins have been published.

Bulletin No. 64, Annual Report of the Extension Service, 1933, by G. E. Adams. April, 1934.

Bulletin No. 65, Rhode Island 4-H Clubs, Clothing, by Dorothy Gatton. May, 1934.

Equipment.

During the period covered by this report the furnishings and equipment of the extension office have been improved by the following additions: office furniture, two steel desks, one steel table, six sections of steel bookcases, seven sections steel filing cabinets, one steel storage cabinet, eight office and desk chairs, one Gardiner Simplex calculating machine. The table, one desk and the office chairs replace the furniture which had been used in the Director's office for nearly a quarter of a century. The mailing room equipment has been improved by the addition of one Improved Model 96 mimeograph and one twenty-inch carriage L. C. Smith typewriter.

Agent Work within the Counties.

During the year there has been maintained a field corps of nine agents, the personnel of which has remained unchanged during the year. The activities of the agents are summarized in the table below:

Total number of farm or home visits	4,273
Number of different farms or homes visited	1,486
Number of calls relating to extension work:	
Office	1,771
Telephone	2,597
Number of news articles or stories published	329
Number of individual letters written	8,096
Number of different circular letters prepared	382
Number of bulletins distributed	7,533
Number of radio talks made	339
Method demonstration meetings held	1,117
Attendance	18,862
Meetings held at result demonstrations	149
Attendance	3,869

Other meetings of an extension nature participated in by agents and specialists	511
Attendance	18,733
Number of 4-H clubs	171
Number of different 4-H members enrolled:	
Boys	1,090
Girls	1,639
Number of different 4-H members completing:	
Boys	957
Girls	1,374

SUMMARY OF EXTENSION INFLUENCES FOR YEAR

Number of farms in State—1930 Census	3,302
Number of farms on which practices were changed as result of extension program	1,831
Number of farm homes in which practices were changed as a result of extension program	851
Number of farm homes with 4-H club members enrolled	1,172
Number of other homes with 4-H members enrolled	1,118
Number of different farm families influenced by extension program	2,237
Number of other families influenced by extension program	1,934

During the past year the County Agents have been very actively cooperating with those agencies, both State and Federal, associated with the recovery emergencies, which have been made necessary as a result of the depression. Farmers have been assisted in filling out application blanks for Federal Land Bank, Land Commissioner and Production Credit Corporation Loans. In cooperation with the A.A.A. a series of educational meetings for the purpose of explaining the Corn-Hog program was held and our farmers given aid and instruction in connection with the operation of the Act. On April 1st the Federal milk license for the Providence and Newport areas became effective. Since that time the County Agents have devoted considerable time to the explanation and working of this license as it affected the individual farmer.

Local Federal Emergency Relief Administrations and other organizations have been assisted in their work, the greatest effort being in connection with the various types of vegetable garden enterprises.

Rural Electrification. The rural electrification demonstration farm has been continued during the year in cooperation with Tockwotton Jersey Farms, Incorporated, and the Narragansett Electric Company. The work has been under the immediate supervision of R. S. Shaw. Data collected for the period from November 1, 1933, to October 31, 1934, show the cost of operating various pieces of dairy and household equipment. In this study each appliance was separately metered. The following tables give cost of operatng four pieces of dairy equipment and three domestic appliances.

ANALYSIS OF POWER COSTS OF DAIRY EQUIPMENT

November 1, 1933, to November 1, 1934

MILKING MACHINE DATA

Average milking herd	28.8 cows
Total production	243,060 lbs. milk
Production per cow	8,440 lbs. milk
Electricity used	813 K.W.H.
Average cost	$22.39
Cost per cow per year	$ .777
Cost per 1,000 lbs. milk	$ .09
Cost per gallon milk	$ .00079

STORAGE REFRIGERATOR (DRY BOX)

Note: Milk and cream stored in this box had been pre-cooled to 40° F. The temperature of 40° F. was maintained in the box throughout the year.

Total quarts milk stored during year	79,865
Total cream stored during year	2,671
Total milk and cream held 12 to 14 hours at 40° F.	82,536
K.W.H. used during year	1,651
Average cost	$44.77
Cost per quart to store	$ .00054

ICE MAKER

This machine performed two jobs.

Milk Cooled to 40° F.		*Ice Made*	
Total milk cooled	85,411 qts.	Total ice made	17,095 lbs.
K.W.H. required	2,900	K.W.H. required	1,842
Cost to cool milk	$105.09	Cost to make ice	$66.75
Cost per quart	$.00123	Cost per 100 lbs.	$.156

Water Pumping

Water Used	*Per Day*	*Annual*
Domestic use	200 gals.	73,000 gals.
Bottle washing, etc.	170 gals.	61,050 gals.
Cows and Horses	1,250 gals.	456,250 gals.
Total	1,620 gals.	590,300 gals.

K.W.H. used — 792 Cost — $22.37 Cost per 1,000 gals. — $.0379

ANALYSIS OF DOMESTIC APPLIANCE COSTS

Range (3 persons in family)

Total current used	2,050 K.W.H.
Cost of power	$63.14
Cost of power per month	$ 5.26
Cost per day	$ .173
Cost per person per day	$ .057

Refrigerator (G.E.)

Total current used per year	605 K.W.H.
Total current used per month	60.4 K.W.H.
Cost of power	$18.68
Cost per day	$ .051
Cost per person per day	$ .017

Water Heater (Five months' use)*

Total current used	1,700 K.W.H.
Total hot water used	Not known
Cost for five months	$52.40
Cost per month	$10.48

Dairy Herd Improvement Associations have been maintained in each farm bureau district. Closely associated with this work is the pasture improvement program which has proven its value during the past year of rising feed prices.

Vegetables. The work in cooperation with commercial vegetable growers has been very materially strengthened during the past year, a greater number of vegetable growers having cooperated with method and result demonstrations than ever before. The work has been developed in connection with the control of insects and plant diseases, by seed and soil treatments, and by changing cultural practices.

---

*The water heater was used for five months only. The cost for heating water on a 3c Kilo watt hour rate is prohibitive as compared with the cost of heating water with a coal burning heater.

Home Demonstration Work.

Farm Housing Survey. In December, 1933, the State Leader of Home Demonstration Work was placed in charge of a farm housing survey which was conducted as a Federal Civil Works Administration project, being Federal Project No. 28. The survey was made in Kent, Providence and Washington Counties, data being secured from 2,030 farm homes; of these 2,013 were frame houses, 12 stone and 5 brick. Divided according to age 235 were under 10 years, 216 were 10 to 24 years, 310 were 25 to 49 years, and 1,269 were 50 years old and over. The average number of rooms per house was 9.34. Water was obtained from wells for 1,808 of the homes, 831 homes had some type of furnace heat, namely, pipeless furnace, warm air, steam or hot water. The source of light was: electricity in 1,590 homes, kerosene or gasoline lamps in 409, acetylene in 8 and piped gas in 9.

Live-At-Home-Program. Continued emphasis was placed upon this phase of the work with a great deal of time being given to the development of better home gardens. Reports received showed that fertilization recommendations were followed in 227 cases, and in the insect and disease control program in 234 cases, during the summer in connection with the farm and home vegetable garden. Assistance was given 522 families in food preservation who canned 48,313 quarts of food in addition to 4,038 other containers of jams and jellies.

Clothing Work. During the year the Home Demonstration Agents devoted 367 days to clothing work in 46 communities where they received assistance from 267 local leaders who devoted 779 days' time to the work.

In the home management and housing project 1,438 families followed the recommendations of the Agents in improving methods of repairing and refinishing furniture. The estimated savings due to the home management and house furnishing program were estimated at $4,246. The work in keeping household accounts has made marked improvement during the year, 161 families having budgeted their food expenditures for the year.

Boys' and Girls' Club Work.

The year 1934 was a successful one for the 4-H Club work. Enrollment gains of the past years were maintained and slightly increased. An increase was made in the average number of months per club in which an active program was carried on, this being due to better systematization of the enrollment, which resulted in more prompt enrollments in the clubs at the opening of the club year in the fall. Average size of projects was increased and the quality of work, according to records submitted, was improved, both for the honor group and for the average member.

Club work has been greatly aided by the continued cooperation of the Grange, the State Grange having provided scholarships at the National 4-H Camp in Washington. All of the Pomona and several of the subordinate Granges held special 4-H Club Nights. State 4-H Camp scholarships were given by the Providence Quota Club, several Parent-Teachers' Associations and other organizations. The school authorities in many towns have been of great assistance in allowing use of school rooms for meetings and entertainments of the clubs, and in a number of cases school busses were used to furnish transportation for club activities.

Each of the farm bureau districts now has a local 4-H leader association which has played an important part in developing and carrying out the program for the year.

The following table presents the progress for the year.

PROGRESS IN 4-H CLUB WORK, 1934

	1933	*1934*
Total enrollment	2,674	2,729
Total boys	1,058	1,090
Total girls	1,616	1,639
Total enrollment at State 4-H Camp	444	483
Total projects completed	4,228	4,343
Number of men leaders and assistants	88	102
Number of women leaders and assistants	225	242
Number members in 4-H club six years or over	123	132
Number leaders who were former 4-H members	31	48

NUMBER COMPLETING IN PRINCIPAL 4-H PROJECTS

	1933		*1934*	
	Boys	Girls	Boys	Girls
Health	744	1,257	902	1,382
Clothing	0	757	0	759
Foods	0	446	3	392
Garden	251	43	257	80
Handicraft	231	5	187	32
Poultry	154	13	121	4
Canning	0	136	1	96
Dairy	66	7	56	2
Other	34	53	55	24

Agricultural Economics.

During the past year practically the entire time devoted to the work in agricultural economics has been occupied in furnishing information which was needed in the formulation of plans and policies for meeting situations which have developed during the past few years in the economic status of our farmers.

On several occasions during the recent past the question of the feasibility of establishing canning factories in Rhode Island has been raised. In the summer of this year the Industrial Committee of the East Greenwich Chamber of Commerce requested information concerning the possibility of establishing a canning factory in or near East Greenwich. In response to this request, information was collected relative to capital requirements, capacity of plant for economic operation, probable supply of raw materials, labor supplies, effects of the introduction of a new agricultural enterprise upon the present farm organization in the area, available labor, relative cost of labor locally and in areas where canhouse products are now being produced. As a result of this study a report was submitted to the Committee, who, in turn, reported to the Chamber of Commerce in early October. This report showed that under present conditions the establishment of such a plant could not be justified on an economic basis.

The Federal milk license for the Providence and Newport areas became effective April 1, 1934. Prior to this date factual data were prepared for use of local producers' associations operating in these markets and for the use of the Dairy Division of the Agricultural Adjustment Administration in formulating the terms and provisions of this license. Since the license became operative the Extension Service has been frequently called in consultation with the Milk Administrator and officials of organizations representing the industry, especially in the consideration of policies regarding the establishment of base ratings. The Specialist is at present acting as an advisory member to the committee on base ratings.

The effect of the license in the Providence market is shown from the fact that prices for the first pay period under the license, April 1 to 15, were: blended price $3.124 per 100 pounds of milk; price delivered for milk above the base $1.163 per 100 pounds. For the last pay period covered by this report, namely, November 16 to 30, the blended price was $3.34, for milk delivered above base $1.443 per 100 pounds. The Class I price according to the license for the Providence area at the present time is $3.40 per 100 pounds for 3.7% milk.

Local cooperative organizations have been rendered assistance in the preparation of statements which could be used as a basis for obtaining loans from the Springfield Bank for Cooperatives.

Agronomy.

The outstanding feature of the agronomy program for the past year has been the increasing interest in the better pasture work and improved hay crops. During the past year a larger acreage of high protein hay has been produced in the State than at any time during the past generation.

The value of high grade pastures, associated with a long pasture season, in the reduction of cost of milk production is shown in the following records taken from dairy herd improvement books in Rhode Island.

Herd No.	Number of Pasture Days	Feed cost per 100 lbs. of milk	Feed cost per lb. of fat
1	184	$0.87	$0.20
2	184	1.10	.29
3	None	1.84	.54
4	30	1.99	.51

Dairy Husbandry.

During the past year an active dairy herd improvement association has been maintained in each one of the three farm bureau districts. At the present time there are 60 herds containing 1,987 cows in the three associations. During the past year the greatest number of cows culled from the herds has been due to low production. The standard as set for a profitable cow in Rhode Island has been 7,500 pounds or more of milk or 300 pounds or more of fat for the year. During the year forty-one dairymen in the dairy herd improvement associations have attained this goal.

Increased interest has been shown in the construction of safety bull pens as our farmers are beginning to see the value of a proven sire. From data which are now being assembled, indications are that there are approximately fifteen proven bulls in the three herd improvement associations.

With the increase in cost of purchased grains an increased number of inquiries has been received as to the most economical rations for the production of milk. The importance of close cooperation between the agronomy and dairy programs is shown from the fact that the five herds having the lowest feed cost per one hundred pounds of milk have had three months more improved pasture than the five herds having the highest cost. The records of the Southern Rhode Island association indicate that the number of days of pasture have a greater influence on the feed cost per one hundred pounds milk than upon the production.

Fruit Growing.

Owing to the very severe injury to all types of tree fruits in the State caused by the severe winter of 1933-34, the program of the Fruit Specialist was subjected to serious modification. A survey of the winter injury showed the peach crop to be a total failure, all trees severely injured and in some cases completely killed. Indications are that full production cannot be expected for two or three seasons.

Pears showed early bud injury resulting in a generally light set of fruit. The trees, however, do not appear to have suffered permanently.

Apples, by far the most important fruit crop in the State, suffered considerable injury. The Baldwin variety was injured the most, the crop harvested being not over fifteen per cent of normal. Many trees, especially in orchards which had not been well fertilized, were completely killed. Many others had many of the lower limbs killed. Gravenstein was injured. However, in most cases the injury was indicated by small and yellow foliage rather than by complete killing of the wood. The Rhode Island Greening suffered very little injury and McIntosh was injured the least of any commercial variety.

In the case of raspberry plantations there was severe loss of canes, with the result that the crop harvested varied on different plantations from one-third to one-half normal.

Demonstrations in connection with the use of chemically treated bands for control of codling moth were repeated in five orchards. The results were again unsatisfactory, as in the five orchards only four moths were found and all of these under one band.

Three result demonstrations comparing flotation sulphur, "Kolofog," lime sulphur and Bordeaux mixture were conducted. The results of these demonstrations may be stated as follows:

FARM NO. 1

Flotation Sulphur	Kolofog
1. Greening apples large and smooth.	1. Greenings medium in size and inclined to be a little rough and russeting.
2. Washed off quite easily.	2. Stayed on fruit well.
3. Color of leaves good.	3. Color good.
4. Complete scab control on all varieties.	4. Scab control satisfactory.

On Farm No. 2 where lime sulphur, flotation sulphur and Bordeaux mixture were used satisfactory results were obtained with all treatments, leaf color was satisfactory, scab control complete, no russeting, and very little misshapen fruit was grown.

The indications from these demonstrations are that flotation sulphur may safely be used as a substitute for lime sulphur.

Several circulars were prepared during the year dealing with methods of orchard management to be followed in overcoming the severe winter injury.

Poultry.

The results of this year's work strongly indicate that the practices which were advocated in the Grow Healthy Chicks plan, which was inaugurated in 1927, have now become accepted practices by a large majority of our poultry producers. In 1927 the mortality in chicks from untested stock was 30%; in 1934 it had been reduced to 13.3%. Mortality in chicks from tested stock in 1927 was 11.5%, the past year 2.2%. Average mortality in all flocks was 18.5% in 1927. This was reduced to 3.2% in 1934. These figures indicate that in the future emphasis should be placed upon other phases of the poultry program.

The progress in the eradication of the Pullorum disease has been equally gratifying as is shown by the following figures. Testing for this disease became a definite part of the extension program in 1925-26. That year 8,175 birds were tested on sixteen different farms; 6.97% were removed as reactors; no Pullorum free flocks were found. During the testing season of 1933-34 the number of birds tested by the official tube method was 12,971 on thirty farms with 2.32% reactors. Of these flocks thirteen, containing 7,467 birds were found to be Pullorum free; five of them containing 2,001 birds were accredited. In addition to the official tube test 24,301 tests were made by the rapid slide method.

In this project increasing emphasis is being placed upon the necessity of keeping production records if the poultry enterprise is to be efficiently managed. The year's results in the production record work may be summarized as follows: Average egg production per bird 168. Average mortality per flock 6.9%. Average number of birds removed during the year as culls 22.6%. Feed required to produce one dozen eggs 6.1 pounds, which cost $.115. The labor cost per dozen eggs in caring for the laying flock was 6 cents.

During the year 255 poultrymen were assisted in disease determination. Five hundred forty birds were examined. In the young stock (194 specimens) the principal causes of death were: mechanical enteritis 29.9%; brooding difficulties 17.5%; Pullorum disease 15.47%; coccidiosis 11.8%. The four principal causes of death in adult birds (329 specimens) were: worm infestation 22.4%; internal laying 17.9%; coccidiosis 16.1%; leucosis 10.3%. Seventeen turkeys from seventeen flocks were examined. Coccidiosis caused the death of 35.2% in this group.

From an examination of the facts stated above, it will be seen that increasing emphasis needs to be placed upon disease control in adult birds.

Recreation.

As a result of the recreational institutes conducted in the Northern and Southern Rhode Island farm bureau districts there have been organized two local recreation councils composed of those who attended the institutes. Reports received at meetings of these councils show that much use has been made of the material obtained at the institutes. Sixteen people reported using the material 100 times before audiences containing 2,299 people. In addition to the use of the material for adult groups much use has been made of it in the local 4-H clubs and at the State Camp.

Vegetable Gardening.

In former years the greater proportion of the Vegetable Specialist's time has been occupied in assisting the Home Demonstration Agents in the home gardening projects and working with the 4-H Club Agents in the development of club gardens. During the past year, for the first time, the Specialist, in cooperation with the three County Agents, conducted method and result demonstrations in cooperation with commercial market gardeners. These demonstrations were devoted to methods of seed and soil treatment and to methods of training tomato plants. Among the outstanding results reported from these demonstrations the following may be cited. Beet seed treated with red oxide of copper showed a germination four or five days earlier than untreated seed and a more even stand of beets was obtained. At harvest, the treated plat gave an increased yield of twelve per cent over the untreated area.

Red copper oxide was also used in treating seed for a three-acre field of early carrots, a small check plot being sown with untreated seed. The product from the treated plat was placed on the market enough earlier than that from the untreated plot so that the returns were approximately $500.00 per acre from the treated area as against practically no returns from the check plot which matured at a time when the local market was glutted, with consequent low prices.

Fall sown spinach seed, treated with red copper oxide, showed by actual counts on the treated and untreated areas, a 300 per cent better stand on the treated sections. At the time this demonstration was last visited, the owner was cutting from the treated areas at the rate of fifty bushels a day but did not believe that he would be able to cut from the untreated plot for at least two weeks or possibly not until spring.

In a tomato staking demonstration one grower plowed under the control plot after the first picking due to blossom end rot. The fruit was harvested from the staked plants for a period of two weeks, then the plots were placed under irrigation and the harvest continued for another period of eight weeks.

Plans are now being made for continuing and extending this type of demonstration during the coming year.

Emergency Work.

During the past year there has been a continuous demand upon the Extension Staff for assistance, from many different agencies and individuals, in helping solve the varied problems of the recovery program arising from the present economic condition of the country. It is impossible to accurately state the amount of time devoted to these activities as they have in general been carried on in connection with the regular routine of work.

The activities in which the Extension workers have participated include the following.

Agricultural Adjustment Administration

Corn-Hog Production Control. Although very few farmers in Rhode Island grow hogs for market, it was deemed advisable to give the plan as much publicity as possible in order that everyone who wished might have an opportunity to sign a contract. Several meetings of the County Agents and Specialist concerned were held, at which all of the plans for the campaign were discussed in detail. Each County Agent prepared news items for the local papers, circular information was sent to all farmers who were known to have four or more brood sows, this list was obtained in cooperation with the local farm bureau directors, five community meetings to explain the plan were held. As a result of all these activities ten contracts were signed. However, as a result of this campaign, many of our farmers were given a better understanding of the aims and objectives of the production control program.

Federal Milk License. Prior to the establishment of the Federal Milk License for the Providence and Newport areas, assistance was given in collecting data and determining the attitude of the producers toward production control under a license system. Since the licenses became effective on April 1st, the Agents and Agricultural Economist, who is acting as advisory member on the base rating committee, have frequently been called upon for information and assistance in explaining the working of the license and assistance in obtaining changes in base ratings.

Federal Farm Housing Survey. This work was conducted as a Civil Works Administration project in charge of the State Leader of Home Demonstration Agents. Two thousand and thirty homes were surveyed in three counties. This survey furnished much valuable data which can be used in connection with various phases of the recovery program and in the Extension program.

Land Policy Section. During the year assistance has been given the Regional Director and his staff in the study of the problem connected with the determination of the marginal land areas which should be purchased by the Federal government and the methods of accomplishing the desired results.

Farm Credit Administration. Assistance was given in the organization of the Providence Production Credit Corporation on January 5, 1934.

During the year more than 200 individual farmers have been assisted in solving their credit problems. This has included aid in making credit statements, securing production credit, Federal land bank and commissioners loans and debt adjustments. The two largest cooperatives in the State were assisted in obtaining loans from the Bank for Cooperatives.

The Director has acted as Secretary of the Agricultural Advisory Committee appointed by the Governor as a Debt Conciliation Board for the State.

National Resources Board. The Director is serving as a member of the Advisory Committee for the New England Regional Planning Commission. In this connection considerable time has been devoted to discussing land utilization problems with the consultant of the Board for Massachusetts, Connecticut and Rhode Island.

An accurate statement cannot be made of the time consumed in connection with the emergency activities enumerated. It is, however, obvious that a relatively large amount of time was taken from the regular planned programs of the Extension workers. When considered from all viewpoints, I consider that the time has been well spent, not only when considering the immediate results obtained, but in the broadening of the outlook of all of the workers concerned, and in better fitting them to understand the problems of our State which should greatly increase their future efficiency.

Consumers' Councils. The State Leader of Home Demonstration Agents and all of the Home Demonstration and County Agricultural Agents have been members of the County Consumers' Councils. They have also attended several meetings of the State Consumers' Council. Radio broadcasts have been given in several instances explaining the Consumers' Council work.

Outlook.

The demand for assistance from the Extension Service has constantly increased in every line of endeavor which is now included in our program of work. In addition, requests for help in agricultural engineering, rural health problems, rural organization and recreation work are being received with increasing frequency. Many lines of effort, which at present are being considered as emergency work, will need to become a permanent part of the Extension program if the objective of Extension work is to be attained, which is a "better rural life and living." At present we have on our staff no full time specialists. If we are to meet the present demands for service, our staff of specialsts should include the following:

Agricultural Economics.

One full-time Economist, one half-time Economist, one full-time clerk.

Rural Organization.

One full-time Rural Sociologist, one half-time clerk.

Home Economics.

One full-time specialist in foods work.

Agricultural Engineering.

One half-time worker.

In order to adequately serve the vegetable growers and florists, the time devoted to this work by a specialist should be increased from one-third time of one man to a full time worker.

At present the Club Agents and Home Demonstration Agents have the advantage of a full time State Leader, while the Leader of County Agricultural Agents devotes only one-sixth of his time to directing and supervising this important line of work.

At present the State funds available for Extension work, to be spent by the State Office, are $1680. To meet the demands, as outlined above, which is a situation similar to that faced by many other states, if the Extension Service is to maintain and increase its efficiency, there should be an increase in the appropriation from both the State and Federal governments. For the greatest efficiency there should be some State funds which are not needed for use as offset to Federal funds, which could be expended in developing types of work for which the Federal funds can not be used.

Farm Bureau Finances. At present all office expenses and expense accounts for the nine county agents are paid from the total State appropriation of $6500, which has to be matched by funds raised within the farm bureau districts, either by town appropriations, membership fees or contributions. With the constantly increasing financial burdens of our towns and cities, it is increasingly difficult to obtain the local support necessary to offset the State funds. Local financing of this work is much more difficult in Rhode Island, where there are no county governing boards having control of financial disbursements in the counties. As an illustration of the difficulty of obtaining funds to match the $2000 appropriation of State funds, we may cite the situation in the Southern Rhode Island Farm Bureau district. This district includes Kent and Washington Counties, (Kent County contains five towns, Washington County eight towns), making thirteen distinct appropriating bodies which must be approached in this district to obtain the $2000 necessary to match the State funds. In the majority of states only two appropriating bodies would need to be contacted; namely the two groups of County Commissioners. The most unfortunate part of this situation is that not only does the failure of a town to make an appropriation for the work reduce the funds available by the amount requested but by twice that sum, due to failure to completely match the State appropriation. Serious consideration should be given to obtaining a change in the State law which will increase the appropriation for the work of the local farm bureaus and remove the necessity of matching State money with town or other local funds. Under the present system, a town which fails to make an appropriation for the work may get fully as much service from the Extension agencies as one which annually appropriates its proportionate quota. This condition actually exists in several cases at the present time.

At no time in its history has the Extension Service received as many calls for service as during the past year and at no time have there been so many local committeemen and leaders assisting with the work. With the demand for, and cooperation in, the work, the Extension group are looking forward hopefully to being of greater service to the people of rural Rhode Island than ever before.

Respectfully submitted,

G. E. ADAMS,

Director.